

CORNELL UNIVERSITY OFFICIAL PUBLICATION

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THE UNIVERSITY CALENDAR FOR 1927-28

Observed by all the departments of the University at Ithaca.

1927

FIRST TERM

Sept. 16, <i>Friday</i> ,	Entrance examinations begin.
Sept. 26, <i>Monday</i> ,	Registration and assignment of new students.
Sept. 27, <i>Tuesday</i> ,	
Sept. 27, <i>Tuesday</i> ,	Registration and assignment of old students.
Sept. 28, <i>Wednesday</i> ,	
Sept. 29, <i>Thursday</i> ,	Instruction begins at 8 A. M.
Oct. 21, <i>Friday</i> ,	Last day for payment of tuition for the first term.
Nov. 23, <i>Wednesday</i> ,	Instruction ends at 6 P. M.
Nov. 28, <i>Monday</i> ,	Instruction resumed at 8 A. M.
Dec. 17, <i>Saturday</i> ,	Instruction ends at 1 P. M.
1928	
Jan. 2, <i>Monday</i> ,	Instruction resumed at 8 A. M.
Jan. 11, <i>Wednesday</i> ,	Founder's Day.
Jan. 28, <i>Saturday</i> ,	Instruction ends.
Jan. 30, <i>Monday</i> ,	Term examinations begin.
Feb. 8, <i>Wednesday</i> ,	Term ends.
Feb. 9, <i>Thursday</i> ,	A holiday.

} Thanksgiving Recess
} Christmas Recess

SECOND TERM

Feb. 10, <i>Friday</i> ,	Registration of all students.
Feb. 13, <i>Monday</i> ,	Instruction begins at 8 A. M.
Mar. 5, <i>Monday</i> ,	Last day for payment of tuition for the second term.
Mar. 31, <i>Saturday</i> ,	Instruction ends at 1 P. M.
April 9, <i>Monday</i> ,	Instruction resumed, 8 A. M.
May 26, <i>Saturday</i> ,	Spring Day: a holiday.
June 4, <i>Monday</i> ,	Term examinations begin.
June 12, <i>Tuesday</i> ,	End of term examinations.
June 18, <i>Monday</i> ,	COMMENCEMENT.

} Spring Recess

COLLEGE OF ARTS AND SCIENCES

FACULTY

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Regarding admission to the College of Arts and Sciences, the General Circular of Information should be consulted.

Two courses are offered in the College of Arts and Sciences, one leading to the degree of Bachelor of Arts, the other leading to the degree of Bachelor of Chemistry.

Neither degree will be conferred upon any student who has not been in residence at Cornell University during the last two terms preceding graduation, nor upon any student who has not been in residence at least two terms in this College, and in this College only.

A student who does not pass twelve hours in any term, with a grade of C or better in at least six of the twelve hours, will be either dropped or placed upon probation. The same penalties may be imposed on students of this College who, having registered in the Summer Session, do not pass four hours of their Summer Session registration, with a grade of C or better in at least two hours.

A student's general record may be so unsatisfactory that the Faculty will refuse him permission to continue in the College even though he has passed twelve hours in the preceding term.

A student failing in the last term of his senior year to pass twelve hours—or, if in a summer session, four hours—may not be recommended for his degree except under such conditions and at such time as the Faculty may designate.

REGISTRATION

Students will file their study cards at the office of the Dean in accordance with instructions issued at the time of registration.

With the consent of the Dean and the approval of his adviser, a student may alter his list of courses during the first six days of instruction. Thereafter, no student will be permitted to cancel his registration for any course in which he is registered, unless he shall previously have obtained from the Dean authorization to do so on the ground of ill health, or for other reasons beyond the student's control.

THE GEORGE C. BOLDT MEMORIAL SCHOLARSHIPS

Mr. George C. Boldt, jr., has created three scholarships of the annual value of five hundred dollars each as a memorial to his father. These scholarships will be awarded at the close of the junior year to the three male students of the College who shall be considered most deserving of this aid. Applications for these scholarships must be filed in the Office of the Dean before March 15 of the academic year preceding the year for which they are awarded.

THE DEGREE OF BACHELOR OF ARTS

I. REQUIREMENTS FOR GRADUATION

1. Credit for one hundred and twenty hours, of which at least ninety hours must be for courses given in the College of Arts and

Sciences. Courses 1, 6, and 7 in Music may be counted as part of the thirty hours which a student may elect outside the College of Arts and Sciences, but may not be counted as part of the ninety hours required in the College. This rule applies also to Military Science 2 and Physical Education 25.

2. A grade of C or better in at least sixty of the required one hundred and twenty hours. (See Section IV: Marks.)

3. Election of courses in accordance with Section III, Course of Study.

4. Completion of the work in Hygiene and Preventive Medicine, and in Military Drill or in Physical Training prescribed by the University Faculty. (See pages 76, 77.)

II. SPECIAL PROVISIONS REGARDING CREDITS TOWARD GRADUATION

5. **In Summer Sessions.** To obtain credit by means of work done in summer sessions, a student must previously have satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. Credit for a maximum of thirty hours, but no more, may be secured in this way.

Credit will be allowed under the same restrictions for work done in summer sessions of other universities belonging to the Association of American Universities by a student regularly registered in this College, but permission to offer such credit must be obtained in advance from the Dean of this College.

6. **Admission to Advanced Standing.** A student admitted to the College of Arts and Sciences from another college of Cornell University, or from any other institution of collegiate rank, will receive credit toward the degree of Bachelor of Arts for the number of hours to which his records may, in the judgment of the Faculty, entitle him. In order, however, to obtain the degree of Bachelor of Arts, he must, as a candidate for that degree, have been in residence at least two terms in the College of Arts and Sciences, and in that college only.

7. **Registration in Two Colleges of the University.** A student who has completed at least ninety hours in courses given in the College of Arts and Sciences may, with the permission of the Faculties concerned, be registered both in the College of Arts and Sciences and also in the Medical College or the Law School. (See paragraph 12, division a.)

8. **Registration in the College and in the Graduate School.** A student who has satisfied all the academic requirements for graduation may, with the permission of the Graduate School, register both in the College of Arts and Sciences and in the Graduate School.

III. COURSE OF STUDY

9. **Number of Hours.** A student must register in each term for at least twelve hours of work. No student may register for more than eighteen hours in any term except by permission of the Dean. A stu-

dent who has not attained in any academic year a grade of C or better in a total of fifteen hours of work will not be permitted to elect more than fifteen hours of work in either term of the subsequent academic year. For registration in a course not in the College of Arts and Sciences, the permission of the Dean of this College and of the Professor in charge of the course must be obtained. (See also paragraph ii under 11C below.)

10. **Prescribed Studies.** Prior to graduation, a student must complete six hours in each of the first two groups listed below and six hours in each of five of the remaining six groups:

1. English and Public Speaking.
2. Foreign Languages.
3. History.
4. Astronomy, Chemistry, and Physics.
5. Biology (including Botany and Animal Biology), and Geology.
6. Philosophy and Psychology, including Educational Psychology.
7. Economics and Government. (For the present, Economics 1, five hours, will be accepted in satisfaction of this requirement.)
8. Mathematics.

11. **Underclassmen.**

a. *Underclass Requirements.* Before the end of the sophomore year, each student is required to complete, in addition to the first two groups mentioned in paragraph 10 above, at least eighteen of the required number of hours in five of the remaining six groups. Of these hours, the student is required to take at least twelve, and advised to take more, in his freshman year. Each six hours may be entirely in one division (for example, English six hours), or partly in one and partly in another (for example, English three hours and Public Speaking three hours). The following courses in foreign languages may not be applied in satisfaction of the foreign language requirement: Greek 1a, 1b; German 1, 1a, 3, 3a; French 1, 3, 3a; Spanish 1, 3; Italian 1. College credit gained by examination at entrance may not be applied in satisfaction of any of these underclass requirements.

These requirements must be completed before a student may begin counting hours in an upperclass group. (See paragraph 12 below.)

b. *Underclass Advisers.* Freshmen and sophomores are under the jurisdiction of the Advisory Board for Underclassmen. Each freshman will be assigned to a member of the Faculty who will act as his adviser during his freshman and sophomore years. The function of the adviser is to assist the student in his choice of studies, to advise him during the term regarding his work, and generally to give him friendly counsel. The approval of the study card and the signature of the adviser must be obtained before the study card is filed at the office of the Dean.

c. *Courses Open to Freshmen.*

i. The following are the courses in the College of Arts and Sciences open to freshmen, except that (1) a student may not register for any

of these courses for which he has not satisfied the prerequisites, if any are specified (see announcement under each course); (2) a student may not register for any of these courses for which he has presented an acceptable equivalent at entrance:

Animal Biology 1, 4, 5, 6a, 6b, 303, 306

Bibliography 1

Biology A

Botany 1

Chemistry 101, 105, 205, 210, 225, 875

English 3, 3a

French 1, 3, 4a, 4b, 5a, 5b, 6

Geology 100, 101, 200, 201, 311, 400

German 1, 1a, 3, 3a, 4, 5, 8

Greek 1a, 1b, 2a, 2b

History 1, 61

Italian 1, 4

Latin 1a, 1, 2

Mathematics 1, 2, 2f, 3, 4, 5, 7, 15

Music 1, 6, 7, by examination (see page 61).

Physics, 3, 4, 6

Spanish 1, 3, 4a, 4b, 5a, 5b, 6

ii. Subject to the permission mentioned in paragraph 9, required courses in other colleges in the regular freshman schedule of those colleges may be elected by a freshman in the College of Arts and Sciences, but only after first obtaining the approval of the Dean of the College and of his adviser.

iii. Under exceptional circumstances, a freshman may by petition secure permission from the Advisory Board for Underclassmen to take courses (including freshman electives in other colleges) in addition to those allowed under i and ii.

d. *Informal Study.* Certain sophomores of high scholastic standing, provided they register for not more than fifteen hours, in not more than four courses, may receive supplementary credit of three hours each term of the sophomore year for informal study under the general supervision of the Advisory Board for Underclassmen. Details of this arrangement will be communicated to those eligible, before registration for the first term.

12. Upperclassmen.

a. *Upperclass Requirements.* When a student has completed sixty hours including the underclass requirements (see paragraph 11a above) he may select an upperclass group. Prior to graduation, he must complete at least twenty hours of work in the group selected, but courses marked with an asterisk (*) may not be counted toward this requirement. With the sanction of his adviser and of the Dean, a student may choose, instead of one of the upperclass groups listed below, a combination of two related groups. A student registered in this college and in another college of Cornell University is excused from ten of these twenty hours. (See paragraph 7.)

b. *Upperclass Advisers.* In choosing his course, an upperclass student must obtain the advice and approval of some professor or assistant professor in his major subject whose signature on the study card must be secured before it may be filed.

c. *Upperclass Groups.*

1. The Classics.
2. Botany.
3. Chemistry.
4. Economics.
5. English and Public Speaking.
6. French and Italian.
7. Geology and Physical Geography.
8. German.
9. History and Government.
10. Mathematics.
11. Philosophy and Education.
12. Philosophy and Psychology.
13. Physics.
14. Animal Biology (Physiology and Biochemistry, Anatomy, Histology, Embryology, Zoology, and Entomology).
15. Psychology and Education (including Physical Education).
16. Spanish and Italian.

d. *Informal Study.* Upperclass group requirements may be satisfied in part by informal study in those departments which provide for such study as a part of the programme of the upperclass group. Informal study in such departments may be applied for by any student who has completed the underclass requirements, and who has at least sixty hours of credit with a grade of B or better in one-half of the hours he has passed. Students may pursue informal study in either the junior or the senior year, or in both years, under the following conditions:

i. Informal study during the first, or junior, year will consist of specified readings and reports, or of experimentation and problem work, which are intended to furnish the student with opportunities for the expression of initiative in his major field of study. This informal study will be supervised by the student's upperclass adviser, and will entitle him to such credit as his adviser is willing to grant for the work the student has completed, provided that no credit in excess of three hours a term shall be given for informal study in the junior year.

ii. The same plan may be followed in the senior year, again entitling the student to a variable amount of credit, not in excess of three hours a term, for informal work done under the supervision of his adviser.

iii. In a department, or departments, constituting an upperclass group in which there is a seminary meeting at least once a week for the purpose of giving tutorial assistance to the students accepted for in-

formal study, the amount of credit obtained by such students may be extended to a maximum of six hours a term during the senior year; provided that, at the close of his senior year, and before his adviser reports credit for this informal work, the student shall have passed successfully a comprehensive examination in the field of study of his upperclass group. (For the degree of Bachelor of Arts with Honors, see page 16).

Theses. During his last two terms of residence any candidate for the degree of Bachelor of Arts may, with the permission of the Dean, arrange with the department in which he is taking his principal work to write a thesis which, if accepted, shall entitle him to not more than three hours of credit a term.

IV. MARKS

13. A, B, C, D are passing grades; E represents a condition; F a failure; Z a course dropped without official cancellation.

14. No credit towards graduation will be given for a course in which a mark of E (condition) is recorded, unless the course be repeated and a passing mark received. A student who has received a mark of E (condition) in any course that is a prerequisite to another course may, at the discretion of the department concerned, be regarded as having satisfied the prerequisite; or the department concerned may, before regarding him as having satisfied the prerequisite, require him, by re-examination or otherwise, to remove the condition.

15. A student who, in any course, has received a term mark of "incomplete" or of "absent" may, with the consent of the Dean, and upon payment of the fee required by the University, be permitted to remove the mark, by examination or otherwise, as the department concerned may direct. A mark of incomplete or of absent may not be removed later than registration day of the third term of attendance in the University, dating from the time the course was taken in class, and no more than one attempt at removal will be allowed.

16. A student who has received a mark of E, of F, or of Z in any course, must re-register for it if he desires to secure credit for the course. (See paragraph 14 for E.)

BACHELOR OF ARTS WITH HONORS

The degree of Bachelor of Arts with Honors in the field of a student's upperclass group will be conferred upon those students who, in addition to having completed the requirements for the degree of Bachelor of Arts, shall have (1) received a grade of B or better in at least half of the courses for which they have been enrolled; (2) passed with distinction a thorough comprehensive examination in the field of study in which their upperclass group requirement was satisfied; (3) been recommended for the said degree by the department or departments in which their work for the upperclass group was done.

THE DEGREE OF BACHELOR OF CHEMISTRY

The degree of Bachelor of Chemistry will be awarded to those who have satisfactorily completed the following curriculum and the requirements prescribed by the University in Hygiene and Preventive Medicine and in Military Drill or in Physical Training.

Students who do not present, on entrance, at least two units of French and two units of German, will be required to make up the deficiency before the beginning of the junior year. This may not be done, except with special permission of the Department, by taking University courses in French or German during the academic year.

CURRICULUM

FIRST YEAR

	No. of Course	First Term	Second Term
Introductory Inorganic Chemistry Chemistry	101	3	—
Introductory Inorganic Laboratory Chemistry	105	3	—
Introductory Qualitative Analysis Chemistry	205	—	3
Introductory Qualitative Laboratory Chemistry	206	—	3
Analytic Geometry and Calculus Mathematics	5a, 7	5	5
Introductory Experimental Physics Physics	5	—	5
Drawing Engineering	125	3	—
English English	1	3	3

SECOND YEAR

Introductory Organic Chemistry Chemistry	305	3	3
Organic Chemistry Laboratory Chemistry	310	3	3
Introductory Quantitative Analysis Chemistry	220	3	—
Introductory Quantitative Laboratory Chemistry	221	3	—
Introductory Chemical Spectroscopy Chemistry	505	—	3
Gas and Fuel Analysis Chemistry	250	4 or 0	0 or 4
Elementary Mineralogy Geology	311	0 or 3	3 or 0
Heat and Light Physics	31	2	—
Magnetism and Electricity Physics	32	—	2
Physical Experiments Physics	34	—	2

THIRD YEAR

Introductory Physical Chemistry Chemistry	405	3	3
Physical Chemistry Laboratory Chemistry	410	3	3
Advanced Inorganic Chemistry Chemistry	130	3	3
Introductory Chemical Microscopy Chemistry	530	3	—
Quantitative Analysis, Lectures Chemistry	235	—	2
Advanced Quantitative Analysis Chemistry	230	—	4
Physical Experiments Physics	34	2	—
Elective (at least)		4	4

FOURTH YEAR

Introductory Industrial Chemistry Chemistry	705	3	3
Seminary Chemistry	905	—	1
Research for Seniors Chemistry		4	4
Mechanical Laboratory Engineering	367	—	4
Electrical Engineering Engineering	417	4	—
Elective (at least)		6	6

Candidates for the degree of Bachelor of Chemistry are required to take at least eight hours in research during the senior year in a division of the Department to be selected by the student. These divisions are: Inorganic Chemistry (Course

195); Analytical Chemistry (Course 295); Organic Chemistry (Course 395); Physical Chemistry (Course 495); Optical Chemistry (Course 595); Sanitary Chemistry (Course 695); Industrial Chemistry (Course 795); Agricultural Chemistry (Course 895).

The elective courses required in the curriculum may be chosen by the student, in each case with the approval of the Department of Chemistry, from the advanced courses in Chemistry, or from certain courses in other departments of the College of Arts and Sciences, or in other colleges of the University.

Students in the Course in Chemistry may register for 20 hours a term. In order to register for more than 20 hours, the student must first obtain the consent of the Department.

THE HONOR CODE IN EXAMINATIONS

Under a constitution proposed and adopted by the students, and approved by the University Faculty on March 9, 1921, the students of Cornell University have made themselves responsible for their conduct in examinations and in other tests of work by which they are earning academic credit. For the trial of charges of breach of honor they elect committees of their own—a central committee for the University, and a committee in each of the colleges. Every student is expected to do his share in upholding the code, not only by honorable conduct on his own part, but also by refusal to conceal or condone fraud on another's part. A fraud observed in any college should be reported to a member of the student honor committee of that college.

COURSES OF INSTRUCTION

The courses that are marked with the asterisk () may not be counted for an upper-class group.*

ASTRONOMY

181. General Astronomy. Throughout the year. Credit six hours upon completion of the course. Not open to freshmen. Professor BOOTHROYD.

Before Thanksgiving and after the Spring Recess each student is expected to complete a certain assigned amount of laboratory work which is done at the *Observatory* during the afternoons and on clear evenings. This will require about two afternoons and one clear evening each week, for which each student will arrange on day of registration.

During this time there will be one lecture a week given to each section at *Lincoln 31*. The *Observatory* will be open for laboratory daily except S from 2 to 5, and every evening except F and S from 8 to 10 P. M.

Between Thanksgiving and the Spring Recess there will be no laboratory, but lectures and recitations will be conducted at room *31, Lincoln*, as follows: Sec. a, at 9; Sec. b, at 3. Each student will register with the department for one of these sections on day of registration.

A study of the facts and principles of the science of Astronomy, together with a brief view of its history as illustrating the gradual development of the scientific method.

183. Modern Astronomy. First term. Credit three hours. Prerequisites, Astronomy 181, Physics 62, Mathematics 7. Professor BOOTHROYD. Recitation and lecture, T Th 9. *Lincoln 31*. Laboratory to be arranged.

An elementary exposition of Gravitational Astronomy, followed by a consideration of spectroscopic and other methods of astronomical investigation.

For courses in Practical Astronomy, and other advanced courses, see the Announcement of the College of Engineering and the Announcement of the Graduate School.

BIBLIOGRAPHY

[1. **Bibliography.** First term. Credit two hours. Librarian AUSTEN. T Th 12. *Library, Political Science Seminary Room*. Not given in 1927-28.]

Applied bibliography dealing with books in groups, their classification, cataloguing, indexing, and preparation.

[2. **Bibliography.** Second term. Credit two hours. Prerequisite, for freshmen, Bibliography 1 or senior standing. Librarian AUSTEN. T Th 12. *Library, Political Science Seminary Room*. Not given in 1927-28.]

Writing and record making from the earliest times. Writing and book making in the Middle Ages. Printing and book making in modern times.

BIOLOGY

***A. General Biology.** Throughout the year. Credit three hours a term. Professor CLAASSEN, Mr. CUTLER, and assistants. Lectures, M W 9 or 11, *East Roberts 222*. Laboratory, T F 8-10:30; M T W Th F 2-4:30. *Roberts 302*.

Not open to students who have had college courses in zoology and botany. Students must report to the biology laboratory, *Roberts Hall 302*, for assignment to laboratory sections.

An elementary course designed for those who do not wish to specialize further in the biological sciences. The main ideas of biology shown through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, \$3.50 a term.

ANIMAL BIOLOGY

***1. Introductory Zoology.** Throughout the year. Credit three hours a term. Professor REED, Assistant Professor YOUNG, Miss MEKEEL, Miss McMULLEN, and Miss PHELPS. Lecture: Section I, T Th 9; Section II, T Th 11. Labora-

tory: M T W F 2-4:30, S 8-10:30. Lectures, *Goldwin Smith B.* Laboratory, *McGraw 2.*

A comprehensive view of the subject including the fundamentals of Animal Biology, the principles of structural and functional organization in the animal body, the origin and perfection of animal life, and a consideration of those generalizations in zoological theory which seem to be best founded.

Students must register with the department before instruction begins.

*1a. **General Zoology.** Second term. Credit three hours. Assistant Professor YOUNG and Miss MEKEEL. Lecture, Th 10, *McGraw 5.* Laboratory for veterinary students, T Th 2-4:30; for others, W F 2-4:30. *McGraw 2.*

A general survey of the animal phyla with special emphasis upon fundamental biological principles. Consideration is given to the larger animal groups and their systematic relationships.

Primarily for students of Veterinary Medicine, Physical Education, and those who begin the premedical course at midyear. Registration before instruction begins is required.

[2. **Invertebrate Zoology.** Throughout the year. Credit three hours a term. Assistant Professor YOUNG. Lecture W 9, *McGraw 5;* Laboratory W F 2-4:30, *McGraw 2.*

The structure, development, and relationships of, and the application of biological principles to, invertebrates. Field studies of the local fauna are undertaken. Registration before instruction begins is necessary. Not given in 1927-28.]

3. **General Entomology.** First term. Credit three hours. Prerequisite, Biology A, Animal Biology 1, or Botany 1. Professor HERRICK, Dr. WEHRLE, and Mr. ————. Lecture, W F 9; Laboratory, T W Th or F 2-4:30, or S 8-10:30. *Roberts 392.*

The characteristics of orders, sub-orders, and the more important families; the habits of representative species; the structure of insects; practice in their classification.

The lectures only (two hours) may be taken by those who have had Animal Biology 4 and 5. Laboratory fee, \$2.50.

Second term. Credit three hours. The life histories, habits and control of injurious insects. Staff and hours as for the first term, except no laboratory section S. Laboratory fee, \$2.

4. **Elementary Morphology of Insects.** Either term. Credit three hours. Prerequisite, Animal Biology 3 or the equivalent. Professor JOHANNSEN and Mr. HERVEY. By appointment. *Roberts 391.*

This course deals with the external and internal anatomy of several common species of insects. Required of all students who plan to take advanced work in entomology. Laboratory fee, \$2.

5. **Wing Venation and Evolution.** Either term. Credit one hour. Open to freshmen. Professor BRADLEY and Mr. FLETCHER. S 11, and two additional hours during T Th or S mornings, by arrangement. *Roberts 301.*

A laboratory study of evolutionary series as illustrated by progressive modification of the wings of insects. Required of all students who plan to take advanced work in entomology. Laboratory fee, \$1.50.

6. **Taxonomy of Insects.** Throughout the year. Credit three hours a term. Prerequisite, Animal Biology 4 and 5. Professor BRADLEY, Dr. FORBES, and Mr. FLETCHER. Lectures, W 10. *Roberts 392.* Laboratory, W F 2-5. *Roberts 301.* Laboratory fee, \$4.50.

A survey of the classification of insects and of the more important and common species, with a study of the characters by which they may be recognized.

6a. **Elementary Taxonomy of Insects.** Either term. Credit one hour. Prerequisites, Animal Biology 4 and 5. Professor BRADLEY and Mr. FLETCHER. One laboratory period of three hours during T Th or S mornings, by arrangement. *Roberts 301.*

Elementary practice in the determination of the families and orders of insects, designed for students who wish a brief survey of insects, but who are not planning to carry further their entomological work. Laboratory fee, \$1.50.

Animal Biology 4, 5 and 6a are introductory laboratory courses in the structure and classification of insects, required of all students who plan to take advanced work in Entomology. The work is individual and all three courses may be taken in one term.

6b. **Entomotaxy.** Second term. Credit two hours. Open to freshmen. Professor BRADLEY. Laboratory and field work, M T 2-4:30. *Roberts* 301.

Methods of collecting insects and preserving them for study, together with other methods of technique. Rough identification of insects collected during the field work. Three all-day field trips will be required. Laboratory fee, \$4.50.

7. **Biology of the Human Species.** First term. Credit one hour. Prerequisite, Biology 1 or the equivalent. Professor NEEDHAM. T Th 11. *Goldwin Smith* A.

The origin and development of man; the evolution of responsive life; the main phenomena of human inheritance; the effect upon population of the alteration of environment by the processes of civilization; the evolution of the social organism, and of social control. Not given in 1927-28.]

8. **Elementary Taxonomy and Natural History of Vertebrates.** Throughout the year. Credit three hours a term. Professor WRIGHT and Mr. GREELEY. Lecture, M 8; Laboratory T or W 2-4:30 and one period by appointment. *McGraw* 7.

Lectures on fishes, amphibians, reptiles, birds, and mammals, dealing with the principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring. Laboratory fee, \$4.00.

Students completing this course, may arrange under Animal Biology 99 to pursue advanced work in the taxonomy of Vertebrates.

9. **General Ornithology.** Second term. Credit three hours. Professor ALLEN, Mr. FUERTES, and Mr. PIRNIE. Lectures, M W 11. *McGraw* 5. Laboratory and field work M W 2-4:30 or T Th 2-4:30. *McGraw. South Museum.*

Introduction to the study of birds, particularly the local species. Laboratory work with bird skins is based on the field work. Laboratory fee, \$2.

Students completing this course may arrange, under course 99, to pursue advanced work during their junior and senior years.

10. **Cytology.** Second term. Credit four hours. Prerequisite, Botany 1 or Zoology 1. Professor SHARP. Lectures and conferences, T Th 9, Laboratory, T Th 10-12:30. *Stone* 203.

The subject matter, literature, and problems of cytology. Of value to advanced students in the various branches of biology, and of special significance for the geneticist. The conference hour is devoted to a discussion of topics suggested by laboratory observations, to assigned reading, and, during the latter part of the term, to the review of new literature. Laboratory fee, \$5.

11. **Comparative Anatomy of Vertebrates.** Throughout the year. Credit three hours a term. Prerequisite, Animal Biology 1 or 1a. Professor REED, Mr. SENNING, Mr. HAZZARD, and Mr. HUNTER. Lecture, Section I, M 8, Section II, M 10. *McGraw* 5. Laboratory, W 2-4:30, S 8-10:30; M F 2-4:30; T Th 8-10:30; T Th 2-4:30. *McGraw* 6.

A thorough dissection and study of the several systems of organs of vertebrates. The various systems are considered with reference to their significance in progressive modifications and vertebrate phylogeny. The lectures deal with a comparative study of type forms so arranged as to supplement and connect the laboratory studies.

12. **Insect Morphology.** Throughout the year. Credit two hours a term. Prerequisites, Animal Biology 4, and 3 or 6a. Professor JOHANNSEN. T Th 10. *Roberts* 392. This course deals with the anatomy, histology, physiology and embryology of insects. Lectures, assigned readings, and reports.

Laboratory work in the technique of histological methods as applied to insect tissues may accompany or follow this course. Either term. Credit two hours. Two periods by appointment. *Roberts* 391. Laboratory fee, \$3.

14. **Genetics** (the same course as Plant Breeding 101). First term. Credit four hours. Prerequisite, Botany 1 and Plant Physiology, or Animal Biology 1

and either Animal or Human Physiology. Assistant Professor FRASER, Dr. DORSEY. Lectures, M W F 8, *Fernow* 210; Laboratory, M W or F 2-4:30, *Fernow* 212. One conference period to be arranged.

Courses in cytology and in taxonomic botany and zoology will be found helpful in connection with this course. Students must obtain assignment to sections at the time of registration. Laboratory fee, \$3.

15. **Advanced Genetics** (the same course as Plant Breeding 201). Second term. Credit three hours. Prerequisite, Animal Biology 10 and 14, and the permission of the instructor. Assistant Professors FRASER and LEWIS. Conferences, T F 2-4, and a laboratory problem in genetic analysis to be solved at the convenience of the student. *Fernow* 212.

Primarily for graduate students. A reading and laboratory course, with two conference periods of two hours each, and special laboratory work to be done at the student's convenience.

The methods of genetical testing and analysis; factor interaction; factor linkage; sex inheritance; mutation; the numerical results of different systems of breeding and selection. Particular attention will be given to the modes of attacking problems in genetics. Laboratory analyses of experimental data, and studies with *Drosophila*. Laboratory fee, \$3.

20. **Animal Ecology**. First term. Credit three hours. Prerequisite, Zoology 1 or Biology 1 and Entomology 3. Mr. PAUL NEEDHAM, and Mr. E. H. WHEELER. Th 9, Th 2-4:30, and one period by appointment. *Roberts* 392.

The lives of animals in relation to their environment; the relation between their structures and instincts and the situations in which they live. Laboratory fee, \$2.50.

21. **General Limnology**. Second term. Credit three hours. Prerequisite or parallel courses, Biology 1, or Animal Biology 1 and 3, or the equivalent. Mr. PAUL NEEDHAM, and Mr. E. H. WHEELER. Lecture, Th 9; Laboratory, Th 2-4:30 and one period by appointment. *Roberts* 392.

The life of inland waters; aquatic organisms in their qualitative, quantitative, seasonal, and ecological relations. The course includes one all-day trip, taken on some Saturday in May. Laboratory fee, \$2.50.

22. **Ichthyology, Advanced Systematic and Field Zoology**. Second term. Credit three hours. Lectures, T Th 8. *McGraw* 7. Laboratory, F 2-4:30, or S 8-10:30. Professor A. H. WRIGHT and Mr. GREELEY.

An amplification of the prerequisite course 8. In the lectures, special emphasis will be laid on the principal phases of animal life; the taxonomy, origin, and evolution of fossil and living groups; geographical distribution; and the literature and institutions of zoology. Laboratory periods will be devoted to the identification of exotic and indigenous forms.

[23. **Herpetology**. (Amphibia.) First term. Credit three hours. Professor WRIGHT and Mr. GREELEY. Lectures T Th 8, *McGraw* 7; Laboratory, F 2-4:30, or S 8-10:30. Not given in 1927-28.]

[24. **Herpetology**. (Reptilia.) Second term. Credit three hours. See announcement for course 121. Professor A. H. WRIGHT and Mr. GREELEY. Not given in 1927-28.]

25. **Mammalogy**. First term. Credit three hours. See announcement for course 22. Professor A. H. WRIGHT and Mr. GREELEY.

26. **Advanced Ornithology**. First term. Credit three hours. Prerequisite Animal Biology 8 or 9. Professor ALLEN and Mr. PIRNIE. Lecture W 11, *McGraw, South Museum*. Laboratory and field work, T Th 2-4:30.

The classification of birds; geographical distribution; the literature and institutions of ornithology; identification of representative birds of the world. The first part of the term will be devoted to field work on the fall migration, and the identification of birds in winter plumage.

30. **Parasites and Parasitism**. First term. Credit two hours. Prerequisite, Biology 1, or Animal Biology 1. Professor MATHESON and Mr. STONE. Lecture, T 9; Laboratory, M or T 2-4:30. *Roberts* 301.

The origin and biological significance of parasitism, and of the structure, life, and economic relations of representative parasites. Laboratory fee, \$2.

31. **Medical Entomology.** Second term. Credit two hours. Prerequisite, Animal Biology I or Biology I. Professor MATHESON and Mr. STONE. Lecture, T 9, *Roberts* 392. Laboratory, M or T 2-4:30, *Roberts* 301.

Insects and other Arthropods which are the causative agents of disease in man and animals, or are the vectors or intermediate hosts of disease-producing organisms. Laboratory fee, \$2.

40. **Bees.** Second term. Credit three hours. Prerequisite, Animal Biology 3 or equivalent. Professor PHILLIPS. Lectures, T Th 9; laboratory, W 10:30-1 or 2-4:30. *Roberts* 292.

Fundamentals of beekeeping; the life history, instincts, and general behavior of bees; their products; the sources of honey; the role of bees in cross-pollination; the equipment of the apiary; wintering problems; the diseases of bees; and the rearing of queens. Laboratory fee, \$2.50.

60. **The Lepidoptera.** First term. Credit three hours. Dr. FORBES. Prerequisite, the consent of the instructor. Lecture M 9; Laboratory by appointment. *Roberts* 392.

65. **Literary Technics.** First term. Credit three hours. Lectures and recitations, M W F 11. *Roberts* 392. Professor BRADLEY.

A critical study of the biologist's work of reference. Practice in the use of generic and specific indices, and of bibliographies, and in the preparation of the latter; methods of preparing technical papers for publication. The rules of nomenclature, including the formation of scientific names.

This course is of a technical nature, and intended to aid students who intend to specialize in Entomology or Zoology in their contact with literature.

67. **Seminary in Systematic Vertebrate Zoology.** First and second terms. Credit one hour a term. Life zone plans of North America, 1817-1920. Distribution and origin of life in North America. Zoogeography of the Old World. Animal coloration. Other topics to be announced. Hours to be arranged. Professor A. H. WRIGHT.

70. **Entomological Reading in Foreign Languages.** Throughout the year. No credit. Prerequisite, elementary knowledge of the language. Professor JOHANNSEN. Two hours by appointment. *Roberts* 342.

French, first term; German, second term. Open to advanced students in entomology who have an elementary knowledge of the language.

75. **Laboratory Methods.** Second term. Credit three hours a term. Prerequisite, major work in Biology. Professor CLAASSEN in charge. F 10-12:30 and 2-4:30; and one lecture period by appointment. Laboratory fee \$4.

For seniors whose upperclass group is in the field of Biology, and for graduates who expect to teach or to follow some phase of zoology as a profession. This course includes such subjects as laboratory equipment; collecting, preservation, and storage of materials; rearing of cultures; modelling in wax; injection of blood vessels and embalming; chart making, and photography of animals including the preparation of lantern slides.

99. **Zoological Problems and Informal Study.** Throughout the year. Credit hours variable. Admission to the course is by consent of the instructor. Professors NEEDHAM, HERRICK, JOHANNSEN, REED, BRADLEY, CROSBY, PHILLIPS, EMBODY, MATHESON, WRIGHT, ALLEN, and CLAASSEN, and Assistant Professor YOUNG. By appointment.

For qualified seniors and juniors. This course may assume the status of an undergraduate seminar according to the needs and convenience of both teacher and student. Opportunity is afforded for the pursuit of special problems or special phases of zoological study beyond that permitted by the more elementary courses. For research work see the Announcement of the Graduate School.

100. **Conservation of Wild Life.** First term. Credit two hours. Professors NEEDHAM, HOSMER, WIEGAND, HERRICK, ADAMS, EMBODY, PALMER, WRIGHT, ALLEN, CLAASSEN, Assistant Professor YOUNG, and Mr. FUERTES and Mr. PIRNIE. T Th 11. *McGraw* 5.

101. **The Tissues: Histology and Histogenesis.** First term. Credit four hours. Prerequisite, Animal Biology I or Biology A. Professor KINGSBURY and

assistants. Lectures, T Th 11, *Stimson* 8; Laboratory, Section I, T Th 8-11; Section II, T Th 2-4:30. *Stimson* 39.

For students of biology or those preparing for medicine. The cell and cellular origin of the body, and the structure and development of its component tissues. Each student will prepare or receive a series of typical microscopic preparations.

102. The Organs: Histology and Development. Second term. Credit four hours. Prerequisite, Animal Biology 101 or its equivalent. Professor KINGSBURY and assistants. Lectures W F 10, *Stimson* 8; laboratory, W F 2-4:30, *Stimson* 39.

A continuation of course 101. Courses 101 and 102 together give the fundamental facts of the microscopic structure and development of the body.

104. Vertebrate Embryology. Second term. Credit five hours. Prerequisite, Animal Biology 101 or its equivalent. Assistant Professor ADELMANN and assistants. Lectures, T Th 11 and lecture or conference, S 11, *Stimson* 8; laboratory, Section I, T Th 8-11; Section II, T Th 2-4:30, *Stimson* 39.

[105. Histology and Histological Methods. First term. Credit three hours. Prerequisite, Animal Biology 1 or Biology A. Assistant Professor ADELMANN and assistants. Not given in 1927-28.]

For students of biology or those who are preparing for the study of medicine. The course is designed to give the basis for understanding the development of the human body.

107. Advanced Histology and Embryology. Throughout the year. Credit three hours or more a term. Prerequisite, Animal Biology 101, and 102 or 104. Professor KINGSBURY, Assistant Professor ADELMANN, and Instructor ROGERS. Day and hours to be arranged. *Stimson* 43.

Primarily for graduates. Open to undergraduates of exceptional qualifications.

[120. The Theory of Development. First term. Credit two hours. Assistant Professor ADELMANN. Hours to be arranged. *Stimson* 8.

Primarily for graduates. One lecture with collateral reading and reports. A series of lectures upon some important phase of Development. Not given in 1927-28.]

212. Advanced and Research Work in Human Anatomy and Neurology. Throughout the year. Credit two or more hours a term. Professor KERR and Assistant Professor PAPEZ. Hours to be arranged. *Stimson* 52.

The laboratories are open to those who have taken the necessary preliminary courses and are otherwise qualified.

221. Structure of the Human Body. First term. Credit three hours. Prerequisite, Animal Biology 1 or 303. Professor KERR. Lectures, M W F 11; one demonstration at an hour to be arranged. *Stimson Amphitheater*.

For students in the biological sciences and for others wishing to obtain a knowledge of the structure of their own bodies. Normal structures of the body, together with its variations and evolution based on development in the individual and the race. Illustrated by specimens, lantern slides, and diagrams.

222. Anatomical Methods. First term. Credit three hours. Prerequisite, Animal Biology 1. Previous work in Comparative Anatomy also is recommended. Assistant Professor PAPEZ and instructors. The laboratory is open any morning except Saturday. Lectures, *Stimson* 49; laboratory, *Stimson* 52.

One lecture and nine hours of laboratory a week are required.

225. Comparative Neurology. Second term. Credit three hours. Prerequisite, Animal Biology 1 and 11. Assistant Professor PAPEZ. T Th 8-11. *Stimson* 52.

A comparative study of the vertebrate nervous system based on dissections of brains of shark and cat, and sections of cat brain stem; the chief nerve mechanisms that determine the form and structure of the nervous systems, their evolutionary and functional significance. One lecture and two laboratory periods.

***303. Elementary Human Physiology.** Credit three hours. First term, M W F 10. Assistant Professor DYE and assistants. Second term, Sect. A, M W F 10. Assistant Professor LIDDELL and assistants. Section B, M W F 12. Instructor MAUGHAN and assistants. *Stimson* 4.

An introductory course for students of the biological sciences and for students who expect to teach physiology in the secondary schools. The course will be composed principally of lectures supplemented with recitations to be arranged at the option of the instructor. Number limited to the capacity of the lecture room. The lectures will be fully illustrated by experiments, lantern slides, and diagrams.

306. Laboratory Work in Physiology. Credit two or more hours. Prerequisite or parallel course, Animal Biology 303. First term, day and hour to be arranged. Assistant Professors DYE and LIDDELL, and members of the staff. *Stimson 28.*

A beginning course in practical physiology.

308. Advanced Work and Research in Physiology. Throughout the year. Credit two or more hours. Prerequisite, previous courses in Physiology. Assistant Professor DYE. *Stimson 31.*

314. Elementary Biochemistry. First term. Credit three hours. Prerequisite, Chemistry 375 or the equivalent. Assistant Professor SUMNER and Dr. GURCHOT. Lectures, M W 12; conferences, F 12. *Stimson 4.*

The substances met with in living things, and the chief facts of digestion, metabolism, and nutrition. (Courses 314 and 314a will not be accepted for the requirements of biochemistry in the Medical College. Chemistry students are advised to take Biochemistry for Medical Students. See the Announcement of the Medical College.)

314a. Laboratory Work in Biochemistry. First term. Credit two hours. Prerequisite or parallel course, Animal Biology 314. Assistant Professor SUMNER and Dr. GURCHOT. M W 2-5. *Stimson 34.*

316. Advanced Biochemistry Lectures. Second term. Credit one hour a term. Prerequisite, Animal Biology 314 and 314a. Assistant Professor SUMNER and Dr. GURCHOT. Hours to be arranged. *Stimson 49.*

320. Advanced and Research Work in Biochemistry. Throughout the year. Credit two or more hours. Prerequisite, Animal Biology 314 and 314a. Assistant Professor SUMNER. Hours to be arranged. *Stimson 34.*

For other courses in Biochemistry, see the Announcement of the Medical College.

SEMINARY

Seminary. Throughout the year. M 4:45-5:45. *Roberts 392.*

The work of an entomological seminary is conducted by the Jugatae, an entomological club which meets for discussion of the results of investigations by its members.

BOTANY

Students wishing instruction in special groups of plants or in special subjects should consult the department.

***1. General Botany.** Throughout the year. Credit three hours a term; both terms of the course must be completed to obtain credit, unless the student is excused by the department. Professor PETRY, Mr. P. R. BURKHOLDER, the Misses GORDON and JACKSON, and Messrs. ALLEN, ARNOLD, LAUBENGAYER, DE FRANCE, and others. Lectures, T Th 9 or 11. *East Roberts 222.* Laboratory, one period of two and one-half hours. *Stone.* Assignment to sections must be made at the time of registration.

The fundamental facts and principles of plant life. A careful study of form, structure, and reproduction of representatives of the principal groups. Attention will be given to life processes, particularly in the higher plants. Laboratory fee, \$3.50 a term.

13. Trees and Shrubs. First term. Credit three hours. Prerequisite, course 1 or its equivalent. Dr. MANNING. Lecture, T 8. *East Roberts 222.* Laboratory or field work, M W or T Th, 2-4:30. One all-day field trip is required. *Stone, Botanical Laboratory.* Assignment to laboratory sections must be made in the Botany office at the time of registration.

The identification of trees and shrubs, in summer and in winter conditions. The laboratory work covering identification will be done largely in the field.

The work of the latter part of the term will be a study of the taxonomy of woody plants. For all students wishing a detailed knowledge of trees and shrubs. Laboratory fee, \$3; deposit, \$3.

117. Taxonomy of the Higher Plants. Second term. Credit four hours. Prerequisite course 1 or its equivalent. Professor WIEGAND and Dr. MANNING. Lecture, M 9. Laboratory, M W F 2-5. *Stone, Botanical Laboratory.*

A study of the kinds of seed plants and ferns, their classifications into genera, families, and orders, and field work on the local flora. Emphasis will be placed on wild plants, but the more common cultivated plants will receive some attention. The course is planned to follow course 1 and to furnish an introduction to the knowledge of the field botany and classification of the higher plants, in preparation for special work in various departments, and as an aid in teaching. Instruction will be given in the preparation of an herbarium and of keys. Laboratory fee, \$4; deposit, \$3.

Students completing this course may arrange, under course 145, to pursue special advanced work in taxonomy.

219. Advanced Taxonomy of Vascular Plants. Second term. Credit two hours. Prerequisite, course 117 or its equivalent. Professor WIEGAND. Hours to be arranged. *Stone.*

Special round-table discussion of topics of particular interest to the taxonomist. One hour is devoted to practical work on some group of plants.

123. Plant Anatomy. First term. Credit four hours. Prerequisite, course 1 or its equivalent, and permission to register. Professor EAMES and Miss JACKSON. Lectures and conferences, T Th S 9; laboratory, T Th S 10-12:30. *Stone 203.* This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material.

The course is planned primarily for students in applied fields of botany, such as pathology, pomology, or genetics. Students desiring a general training in this subject should take course 126. Laboratory fee, \$5.

124. Cytology. Second term. Credit four hours. Prerequisite, course 1 or Zoology 1 and preferably course 126. Professor L. W. SHARP and Miss MCCLINTOCK. Lectures and conferences, T Th 9. Laboratory, T Th or W F 10-12:30. *Stone 205.*

This course deals with the subject matter, literature, and problems of cytology. The survey of the field is sufficiently inclusive to make the course of value to advanced students in the various branches of biology. The conference hour is devoted to a discussion of topics suggested by the laboratory observations and assigned reading, and during the latter part of the term, to the review of new literature. Laboratory fee, \$5.

224. Seminary in Cytology. First term. Hours to be arranged. Professor L. W. SHARP.

[126. Morphology of Vascular Plants. First term. Credit four hours. Prerequisite, course 1 or its equivalent. Professors EAMES and PETRY and Miss JACKSON. Not given in 1927-28.]

An advanced course in the comparative morphology and life histories of vascular plants. Laboratory fee, \$5.

Comparative Morphology of Fungi. Given in the Department of Plant Pathology.

227. Seminary in Morphology. Throughout the year. Professor EAMES. Hours to be arranged.

131. Plant Physiology. First or second term. Credit four hours. Prerequisite, course 1. First term, Professor KNUDSON, Assistant Professor HOPKINS, and Mr. SCHULTZ. Second term, Professor O. F. CURTIS, Assistant Professor HOPKINS, and Mr. SCHULTZ. First term, *Caldwell 143*; second term, *Roberts 292.* Laboratory, T Th 2-4:30. *Stone 21.* Assignment to laboratory sections must be made at the time of registration.

This course is designed to acquaint the student with the general principles of plant physiology. Topics such as water relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, growth, and reproduction are studied in

detail; in both laboratory and recitations emphasis is placed on discussion of the principles taught and their applications. Laboratory fee, \$4; deposit, \$2.

231. Plant Physiology, Advanced Lecture Course. Throughout the year. Credit three hours a term. Prerequisite, training in botany and chemistry, to be determined in each case by the department. Recommended for seniors and graduate students. Professors KNUDSON and O. F. CURTIS. Lectures M W F 10. Roberts 292.

232. Plant Physiology, Advanced Laboratory Course. Throughout the year. Credit three hours a term. Prerequisite or parallel, course 231. Professors KNUDSON, O. F. CURTIS, and Assistant Professor HOPKINS. Laboratory, M 2-5, S 8-12:30. Stone 21. Laboratory fee, \$5; breakage deposit, \$2.

233. Seminary in Plant Physiology. Throughout the year. Required of graduate students taking work in the department. Professors KNUDSON, O. F. CURTIS, and Assistant Professor HOPKINS. Conference, F 11. Stone.

The presentation and discussion of current contributions to plant physiology; reports on the research problems of graduate students and members of the staff.

[141. History of Botany. Second term, without credit. Not given in 1927-28. A course of lectures given by various members of the staff with the purpose of acquainting advanced students of botany with the historical development of their sciences.]

145. Special Problems in General Botany, Taxonomy, Histology, and Cytology. Throughout the year. Credit not less than two hours a term. By appointment. Professors WIEGAND, EAMES, L. W. SHARP, and PETRY, and Assistant Professor MUENSCHER.

Students engaged in special problems or making special studies may register in this course. They must satisfy the instructor under whom the work is taken that their preparation warrants their choice of problem. The laboratory fee depends on the nature of the work and on the number of credit hours.

CHEMISTRY

All courses listed below are to be given in the Baker Laboratory of Chemistry.

INORGANIC CHEMISTRY

***101. Introductory Inorganic Chemistry.** Lectures. Repeated in the second term. Credit three hours.

Two sections: M W F 11; T Th S 11. *Main Lecture Room.* Professor BROWNE and Assistant Professor MCKINNEY.

Entrance credit in chemistry does not carry with it University credit in Course 101 or 105. If a student entering the University from a preparatory school desires credit for these Courses, he must pass an examination set by the Department of Chemistry. This examination is held in New York City and in Ithaca on the same day in September as the entrance examination. University credit in Courses 101 and 105 that is obtained by passing this examination does not carry with it entrance credit in Chemistry.

Examinations for those who were unavoidably absent from the final examination in course 101 will be held at 2 p. m. on the day before instruction begins in the fall.

***105. Introductory Inorganic Chemistry.** Recitations and laboratory practice. Repeated in the second term. Credit three hours.

Recitations, one hour a week, to be arranged.

Laboratory sections: M F 2-4:30; T Th 2-4:30; W 2-4:30; S 8-10:30. Room 150. Professor BROWNE, Assistant Professor MCKINNEY, and assistants.

Chemistry 101 and 105 must be taken simultaneously unless permission is obtained by the student from the Dean of his college and from the Department of Chemistry to take either course alone.

130. Advanced Inorganic Chemistry. Throughout the year. Credit three hours a term. Prerequisite or parallel courses, Chemistry 405 and 410. Professor DENNIS. M W F 11. Baker 107.

Lectures. The chemical elements are discussed in the order in which they occur in the Periodic Table of Mendeléeff, with special attention to the group properties

of the elements and to the relations of the groups to one another. The rare elements and the rare earths are treated in as great detail as are the more common elements.

135. Advanced Inorganic Chemistry. Either term. Credit one to six hours. Prerequisite, Chemistry 305 and 310. Professors DENNIS and BROWNE and assistants. Day and hour to be arranged. *Baker 178 and 122.*

Laboratory practice. The preparation, purification, properties, and reactions of inorganic compounds including those of the rarer elements.

Chemistry 135 is designed to accompany Chemistry 130, but either course may be taken separately.

150. The Chemistry of Glass. First term. Credit one hour. Dr. LAUBEN-GAYER, T 9. *Baker 107.*

A discussion of the development and manufacture of glass, with special emphasis on the relations between constitution and physical and chemical properties.

195. Research for Seniors. Throughout the year. Professors DENNIS and BROWNE and Assistant Professor MCKINNEY. See page 17.

ANALYTICAL CHEMISTRY

205. Introductory Qualitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 101 and 105. Must be taken with Course 206. Assistant Professor NICHOLS, Dr. COREY, and assistants.

Lectures: Assistant Professor NICHOLS, M W F 9. *Baker 107.*

Recitations: one hour a week, to be arranged.

A study of the application of the theories of general chemistry, to the systematic separation and detection of the common elements and acid radicals.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 206 instead of Course 210.

206. Introductory Qualitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 101 and 105. Must be taken with Course 205. Assistant Professor NICHOLS, Dr. COREY, and assistants.

Laboratory section: M W F 2-4:30. *Baker 50.*

Laboratory practice. A study of the properties and reactions of the common elements and acid radicals; the qualitative analysis of a number of solutions and solid compounds.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 205 instead of Course 210.

***210. Introductory Qualitative Analysis.** Shorter course. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 101 and 105. Dr. COREY and assistants.

Lecture: Dr. COREY. T 12. *Baker 207.*

Laboratory sections: T Th 8-10:30; T Th, 2-4:30. *Baker 50.*

The properties and reactions of the common elements and acids; their detection in various liquid and solid mixtures.

215. Advanced Qualitative Analysis. First term. Credit three hours. Prerequisite, Chemistry 220, 221, 305, and 310. Assistant Professor NICHOLS, Dr. COREY, and assistants. Day and hour to be arranged. *Baker 50.*

Laboratory practice. Essentially a continuation of Course 206. The methods for separating and detecting a number of metals and acids not studied in Course 206, including many of the rare elements. The qualitative analysis of a number of solutions, solid mixtures, natural and commercial products will be required. For graduates and advanced undergraduates.

220. Introductory Quantitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 205 and 206. Must be taken with Course 221. Assistant Professor NICHOLS, Mr. HOSKING, and assistants.

Lectures: Assistant Professor NICHOLS. T Th 9. *Baker 207.*

Recitations: one hour a week, to be arranged.

A study of the fundamental principles of gravimetric and volumetric analysis with practice in stoichiometry.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 221 instead of Course 225.

221. Introductory Quantitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 205 and 206. Must be taken with Course 220. Assistant Professor NICHOLS, Mr. HOSKING, and assistants.

Laboratory Sections: First term, M T W 2-4:30; T Th 10-12:30; S 8-1; second term, W Th F 2-4:30; T Th 10-12:30; S 8-1. *Baker 252.*

Laboratory practice in the preparation and standardization of various volumetric solutions and the analysis of a variety of substances by volumetric and gravimetric methods.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 220 instead of Course 225.

***225. Introductory Quantitative Analysis.** Shorter course. Repeated in the second term. Credit three hours. Prerequisite or parallel course, Chemistry 210. Mr. HOSKING, and assistants.

Lecture: Mr. HOSKING. Th 12. *Baker 207.*

Laboratory sections: T Th 8-10:30; T Th 9-11:30; M W 2-4:30; T Th 2-4:30. *Baker 252.*

A study of the fundamental principles of gravimetric and volumetric analysis.

230. Advanced Quantitative Analysis. Repeated in the second term. Credit four hours. Prerequisite, Chemistry 220 and 221. Assistant Professor NICHOLS, Mr. HOSKING and assistants.

Recitation: one hour a week, to be arranged.

Laboratory periods: first term, M T W 2-4:30; T Th 9-11; S 8-1; second term, M T W Th F 2-4:30; T Th S 8-1. *Baker 277 and 294.* Students will be assigned to a combination of laboratory periods that will total seven and one-half hours a week.

Gravimetric, volumetric, and electrolytic methods of analysis, and methods of combustion analysis; the calibration of weights and volumetric apparatus; analysis of iron and steel, alloys, silicates, etc.

235. Advanced Quantitative Analysis. Second term. Credit two hours. Prerequisite, first term of Chemistry 405. Assistant Professor NICHOLS. M W 12. *Baker 207.*

Lectures: Selected topics in advanced quantitative analysis, stoichiometry.

240. Electrochemical Analysis. Repeated in the second term. Credit two hours. Prerequisite, Chemistry 230 and 405. Assistant Professor NICHOLS and Mr. HOSKING. Day and hour to be arranged. *Baker 292.*

Laboratory practice. The most approved electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, and zinc; practice in the analysis of alloys and ores.

245. Assaying. First term. Credit two hours. Prerequisite, Chemistry 225 (or 220 and 221), and, if possible, a course in mineralogy. Mr. HOSKING and assistants.

Lecture: Mr. HOSKING. M 9. *Baker 202.*

Laboratory sections: M 2-4:30; W 2-4:30. *Baker B-91 and B-96.*

Lectures on the theory and practice of scorification and crucible assay, and on the metallurgy of copper, lead, zinc, silver, and gold; laboratory practice in the assay of zinc, lead, copper, gold and silver ores, mattes, and bullion.

250. Gas and Fuel Analysis. Repeated in the second term. Credit four hours. Prerequisite, Physics 5. Open to those who have completed or are taking Chemistry 220 and 221. Mr. MORSE and assistants.

Lectures: Mr. MORSE. M W 11. *Baker 207.*

Laboratory sections: M T 2-4:30; W Th 2-4:30; T Th 10-12:30; S 8-1. *Baker 282.*

The complete analysis of coal gas, flue gas, and air; the determination of the heating power of gaseous, liquid, and solid fuels; the analysis of coal; standard methods of testing various petroleum and coal-tar products; the analysis of various substances by methods involving the use of different types of gas evo-

lution apparatus. Problems are assigned which afford practice in the calculation and interpretation of results.

255. Advanced Gas Analysis. First term. Credit two hours. Prerequisite, Chemistry 250. Assistant Professor NICHOLS. M W 12. *Baker 207.*

Lectures. A presentation of important methods and a discussion of special forms of apparatus used in scientific gas analysis.

260. Advanced Gas Analysis. Either term. Credit two hours. Prerequisite, Chemistry 250. Assistant Professor NICHOLS, Mr. MORSE, and assistants. Day and hour to be arranged. *Baker 282.*

Laboratory practice. The use of special forms of apparatus; practice in the design and construction of apparatus for scientific investigation in this field. Course 260 is designed to accompany Course 255, but either course may be taken separately.

270. Special Methods of Quantitative Analysis. Either term. Credit two, three, or four hours. Prerequisite, Chemistry 230 and 235. Assistant Professor NICHOLS and assistants. Day and hour to be arranged. *Baker 277.*

Laboratory practice in the application of special methods such as indirect analysis, conductivity, electrometric titrations, etc., to quantitative analysis, and the analysis of special steels, ores, slags, alloys, etc.

Within certain limits the work may be selected to suit the requirements of the individual student.

295. Research for Seniors. Throughout the year. Assistant Professor NICHOLS and Dr. COREY. See page 17.

ORGANIC CHEMISTRY

305. Introductory Organic Chemistry. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 210 and 225 (or 205, 206, 220 and 221). Open to those who are taking Course 220. Assistant Professor J. R. JOHNSON and Mr. BEACH. M W 9, *Baker 207*; F 9, *Baker, Main Lecture Room.*

Lectures and written reviews. The more important compounds of carbon, their occurrence, methods of preparation, relations and uses; illustrated by experiments and material from the museum.

310. Introductory Organic Chemistry. Throughout the year. Credit three hours a term. Prerequisite or parallel course, Chemistry 305. Assistant Professor J. R. JOHNSON, Mr. BEACH, and assistants. Laboratory sections: M T 2-4:30; T 10-12:30; F 2-4:30; S 8-1. *Baker 250.*

Laboratory practice and oral reviews. The student prepares a large number of typical compounds of carbon and familiarizes himself with their properties, reactions, and relations.

315. Advanced Organic Chemistry. Throughout the year. Credit two hours a term. Prerequisite, Chemistry 305 and 310. Assistant Professor JOHNSON and Mr. BEACH. T Th 9. *Baker 206.*

Lectures. A presentation of important chapters of organic chemistry and a discussion of classical researches in this field.

320. Advanced Organic Chemistry. Either term. Credit two to six hours a term. Prerequisite or parallel course, Chemistry 315. Assistant Professor J. R. JOHNSON, Mr. BEACH, and assistants. Day and hour to be arranged. *Baker 208.*

Laboratory practice. An advanced course in the preparation of organic compounds. The original literature is consulted, and the student is required to repeat some extended and important piece of work, and to compare his results with those published.

[340. Methods of Organic Analysis. Either term. Credit two to six hours a term. Prerequisite, Chemistry 305 and 310. Assistant Professor J. R. JOHNSON and Mr. BEACH. Day and hour to be arranged. *Baker 208.* Not given in 1927-28.]

375. Elementary Organic Chemistry. First term. Lectures and written reviews only, four hours credit; with laboratory, five to six hours credit. Students who are preparing for the study of medicine must take the entire six hours. Prerequisite, Chemistry 210 and 225 (or 205, 206, 220, and 221). Open to those who are taking course 220. Mr. BEACH and assistants.

Lectures and written reviews, Mr. BEACH. M W F S 12. *Baker, Main Lecture Room.*

Laboratory section and oral reviews, M W 2-4:30. *Baker 250.*

395. **Research for Seniors.** Throughout the year. Professor ORNDORFF and Assistant Professor J. R. JOHNSON. See page 17.

PHYSICAL CHEMISTRY

405. **Introductory Physical Chemistry.** Throughout the year. Credit three hours a term. Prerequisite, Chemistry 305 (or 375) and Physics 5 and 31. Professor BRIGGS. M W F 9. *Baker 7.*

Lectures. A systematic presentation of modern chemical theory in which special attention is paid to the following topics: Gases, liquids, and solids; the theory of solution; reaction velocity, catalysis, and chemical equilibrium; the Phase Rule; colloid chemistry; thermochemistry; and elementary electrochemistry. Problems in physical chemistry.

It is advisable, but not obligatory, that course 410 accompany this course.

410. **Introductory Physical Chemistry.** Throughout the year. Credit three hours a term. Prerequisite or parallel course, Chemistry 405. Professor BRIGGS and assistants. Laboratory sections: M T 2-4:30; S 8-1. *Baker 1.*

Laboratory practice. Qualitative and quantitative experiments illustrating the principles of physical chemistry and including practice in performing physico-chemical measurements. An important feature of this course is the presentation of detailed reports based upon data obtained in the laboratory.

[415. **Advanced Physical Chemistry.** Throughout the year. Credit two hours a term. Prerequisite, Chemistry 405. Professor BANCROFT. T Th 11. *Baker 7.*

An exposition of the law of mass action in its application to chemical equilibrium and reaction velocities. Not given in 1927-28.]

430. **Applied Colloid Chemistry.** Throughout the year. Credit two hours a term. Open to candidates for the degree of Bachelor of Chemistry if they have completed Chemistry 405, to others only by special permission. Professor BANCROFT. T Th 10. *Baker 7.*

Lectures. The theory of colloid chemistry and its application in the arts.

450. **Applied Electrochemistry.** Throughout the year. Credit two hours a term. Prerequisite, Chemistry 405. Professor BRIGGS. M W 12. *Baker 7.*

Lectures. The theory of electrolysis and electromotive force; electrolytic extraction and refining of metals; electrolytic manufacture of organic and inorganic compounds; theory and practice of storage cells; preparation of compounds in the electric furnace. Problems in electrochemistry.

455. **Applied Electrochemistry.** Throughout the year. Credit two hours a term. Prerequisite or parallel course, Chemistry 450. Professor BRIGGS and assistant. Day and hour to be arranged. *Baker 1-A.*

Laboratory practice. Qualitative and quantitative study of electrolysis; determination of electrical conductivity; potentiometric measurements; hydrogen ion concentration; determination of current and energy efficiencies in electrolytic and electrothermal work; electrolytic preparation of organic and inorganic compounds; tests of storage cells; preparation of compounds in the electric furnace; measurement of furnace temperatures.

460. **Theoretical Electrochemistry.** Throughout the year. Credit two hours a term. Prerequisite, Chemistry 405. Professor BANCROFT. T Th 11. *Baker 7.*

465. **Advanced Physical Chemistry.** Either term. Credit variable, but not to exceed six hours a term. Prerequisite, determined in each case by the Professor in charge. Professors BANCROFT and BRIGGS and assistants. Hour and work to be arranged. *Baker 94.*

Laboratory practice. Students may elect in mass law, reaction velocity, or efficiency measurements with special reference to course 415; in photo-chemistry, photography, or colloid chemistry with special reference to course 430; in conductivity, or electrometric determinations with special reference to course 460; in electrolytic, or electric furnace products with special reference to course 450; in the application of physical chemical methods to organic chemistry.

495. **Research for Seniors.** Throughout the year. Professors BANCROFT and BRIGGS. See page 17.

OPTICAL CHEMISTRY

505. **Introductory Chemical Spectroscopy.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 210 and 225 (or 205, 206, 220, and 221). Open to those who have completed or are taking Physics 31. Assistant Professor PAPISH and assistants.

Lectures and written reviews. Assistant Professor PAPISH. T Th 9. *Baker 377.*

Laboratory sections: T W F 2-4:30; *Baker 396.*

The construction and the use in chemical analysis of the spectroscope, polariscope, refractometer, colorimeter, and nephelometer. The laboratory instruction is devoted to the training of the student in the use of these instruments in the solving of chemical problems.

510. **Advanced Chemical Spectroscopy.** Either term. Credit two or more hours. Prerequisite, Chemistry 505. Assistant Professor PAPISH and assistants. Day and hour to be arranged. *Baker 396.*

Laboratory practice. The study of arc, spark, and absorption spectra and the application of spectroscopic methods to the identification of dyestuffs. Practice in one or more of the subjects mentioned may be selected by the student.

520. **Spectrographic Methods.** Either term. Credit one or more hours. Prerequisite, Chemistry 505. Assistant Professor PAPISH. Laboratory hours to be arranged. *Baker 396.* Conference, Th 10. *Baker 377.*

Laboratory practice. The application of photographic methods to arc, spark, and absorption spectroscopy. Practice is also given in the application of ultra-violet spectroscopy in chemical analysis.

525. **Special Methods in Optical Chemistry.** First term. Credit two hours. Prerequisite, Chemistry 505. Assistant Professor PAPISH.

Lectures, Assistant Professor PAPISH. F 9. *Baker 377.*

Laboratory, hours to be arranged. *Baker 396.*

Lectures, demonstrations, and laboratory practice. Special optical instruments as applied to the solution of problems arising in the chemical industries and in research; modifications of commonly employed polarimeters, refractometers, nephelometers, colorimeters, glarimeters, etc., as employed in specific industries.

530. **Introductory Chemical Microscopy.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 210 and 225 (or 205, 206, 220, and 221) and Physics 31 or by special permission. Professor CHAMOT, Dr. MASON, and assistants.

Lecture: Professor CHAMOT. First term, M 12; second term, M 10. *Baker 377.*

Laboratory sections: M T 2-4:30; T Th 9-11:30; Th F 2-4:30. *Baker 378.*

Lectures and laboratory practice. The use of the microscope and its accessories; microscopic methods as applied to chemical and other scientific investigations; micrometry; the examination of crystalline compounds and industrial materials; recognition of textile and paper fibers, etc. The application of microscopic methods to quantitative analysis.

535. **Advanced Chemical Microscopy.** Repeated in the second term. Credit three or more hours. Prerequisite, Chemistry 530. Professor CHAMOT, Dr. MASON, and assistants. Laboratory periods, to be arranged. *Baker 378.* Conference, T 9. *Baker 384.*

Laboratory practice in the examination and analysis of inorganic substances containing the more common elements with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

[540. **Advanced Chemical Microscopy.** Second term. Credit two hours. Prerequisite, Chemistry 530. Professor CHAMOT, Dr. MASON, and assistants. Day and hour to be arranged. *Baker 378.*

Laboratory practice. Organic qualitative microscopic analysis as applied to the detection of common commercial organic compounds, vegetable alkaloids, "strong drugs," etc., with particular emphasis upon the analysis of minute quantities of material. Not given in 1927-28.]

545. Microscopy of Commercial Alloys. Second term. Credit two hours. Prerequisite, Chemistry 530 or special permission. Professor CHAMOT, Dr. MASON, and assistants. Th F 2-4:30. *Baker* 384.

Laboratory practice. An introduction to the methods employed in the microscopic examination of metals, alloys, and other metallurgical products; practice in grinding, polishing, and etching specimens for microscopic study; metallographic microscopes and their use.

This course may be extended to include other materials of construction.

550. Microscopy of Foods and Beverages. First term. Credit two hours. Prerequisite, Chemistry 530. Professor CHAMOT, Dr. MASON, and assistants. Laboratory hours to be arranged. *Baker* 378.

560. Special Methods in Chemical Microscopy. Second term. Credit two hours. Prerequisite, Chemistry 530. Professor CHAMOT and Dr. MASON. W F 9. *Baker* 377.

Lectures and demonstrations. Theory and applications of instruments, accessories and methods used in critical microscopy, ultra-microscopy, photomicrography, and other special fields. Typical applications of microscopic methods in research and industry.

565. Special Methods in Chemical Microscopy. Second term. Credit one or more hours. Prerequisite, special permission. Professor CHAMOT and Dr. MASON. Day and hour to be arranged. *Baker* 378 and 382.

Work may be elected in various fields such as photomicrography, ultra-microscopy, crystal studies, micro-manipulations, quantitative determinations, and the microscopy of industrial materials.

595. Research for Seniors. Throughout the year. Professor CHAMOT, Assistant Professor PAPISH, and Dr. MASON. See page 17.

SANITARY CHEMISTRY

605. Introductory Sanitary Chemistry (Foods). First term. Credit two hours. Prerequisite, Chemistry 305 (or 210, 225, and 375). Mr. BEDIENT. T Th 11. *Baker* 377.

Lectures. Chemistry of foods, beverages, and food accessories; special apparatus; adulteration and misbranding, sweeteners, preservatives, food colors, food poisonings, and methods for their detection. Relation of the chemical composition of materials used in the household to the public health. Garbage disposal.

It is advisable, but not obligatory, that Course 610 accompany this course.

610. Introductory Sanitary Chemistry (Foods). First term. Credit two hours. Prerequisite or parallel course, Chemistry 605. Mr. BEDIENT and assistant. Laboratory sections at hours to be arranged. *Baker* 352.

Laboratory practice. Laboratory exercises designed to illustrate the material presented in course 605. General and special methods of analysis of foods, beverages, and food accessories, with special reference to the detection of adulteration. The use of saccharimeters, refractometers, cryoscopes, muffle furnaces, vacuum ovens, etc.

615. Introductory Sanitary Chemistry (Water.) Second term. Credit two hours. Prerequisite, Chemistry 305 (or 210, 225, and 375). Mr. BEDIENT. T Th 11. *Baker* 377.

Lectures. Pollution of water; physical, chemical, bacteriological, and microscopical examination of water for household and municipal purposes; introduction to the methods of water purification, and water softening, and their control. Interpretation of analytical results and the preparation of sanitary surveys.

It is advisable, but not obligatory, that Course 620 accompany this course.

620. Introductory Sanitary Chemistry (Water). Second term. Credit two hours. Prerequisite or parallel course, Chemistry 615. Mr. BEDIENT and assistant. Laboratory sections at hours to be arranged. *Baker* 352.

Laboratory practice. Laboratory exercises designed to illustrate the material presented in Course 615.

[630. Advanced Sanitary Chemistry (Water). First term. Credit two hours. Prerequisite, Chemistry 615. Mr. BEDIENT.

Laboratory practice to accompany this course may be elected under Course 635. Not given in 1927-28.]

635. Advanced Sanitary Chemistry. Either term. Credit two or more hours. Prerequisite, to be determined in each case by the instructor in charge. Mr. BEDIENT and assistant. Day and hour to be arranged. *Baker* 352, 356, 358. Laboratory practice.

Students who have had adequate preparation may elect work in any branch of sanitary chemistry. Among others, work along the following lines may be taken:

The bacteriology of water.

Continuation of work offered in courses 610 or 620.

The control of water purification.

Water softening.

The work in many cases may be arranged to meet the needs of the individual student.

695. Research for Seniors. Throughout the year. Mr. BEDIENT. See page 17.

INDUSTRIAL CHEMISTRY

705. Industrial Chemistry. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 405. Professor RHODES. M W F 10. *Baker* 177.

Lectures. A discussion of various typical processes of chemical manufacturing from the standpoint of: (a) available materials, their properties and limitations; (b) standard forms of apparatus used in chemical manufacturing; (c) properties and specifications of commercial chemicals; (d) computation of costs and profits in chemical manufacturing.

By special permission, candidates for the degree of Bachelor of Chemistry may be permitted to register for Course 705 in their junior year and to postpone a part of their elective hours until the senior year.

710. Industrial Chemistry. Second term. Credit three hours. Prerequisite, Chemistry 405. Professor RHODES, Dr. JOHNSON, and assistants. Day and hour to be arranged. *Baker* B-78.

Laboratory practice. The study in the laboratory, on a semi-plant scale, of processes and materials used in the chemical industries.

715. Selected Topics in Industrial Chemistry. Second term. Credit three hours. Prerequisite or parallel course, Chemistry 705. Professor RHODES. M W F 11. *Baker* 177.

Lectures. A discussion of special topics in industrial chemistry. The lectures in 1926-27 will deal with the theory and design of chemical plant equipment for distillation, evaporation, drying, etc.

725. The Chemistry of Fuels. First term. Credit three hours. Prerequisite or parallel course, Chemistry 705. Professor RHODES. M W F 11. *Baker* 177.

Lectures. The chemistry of coal, coke, petroleum, tars, and the fuel gases. Particular stress is laid upon the theoretical chemistry involved in the carbonization of coal, the gasification of coal, and the distillation and refining of petroleum and tar.

730. Chemical Plant Design. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 705. Professor RHODES and Dr. JOHNSON. Day and hour to be arranged.

Conferences and calculation periods. Practice in the calculation and design of chemical plant equipment.

***775. Engineering Chemistry.** Repeated in the second term. Credit two hours. Prerequisite, Chemistry 101. Not open to students who are candidates for the degree of Bachelor of Chemistry. Dr. JOHNSON. M W 8. *Baker, Main Lecture Room.*

Lectures. Chemistry in its relations to engineering.

776. Chemistry of Pulp and Paper. Second term. Credit two hours. Prerequisite, Chemistry 775. Open to students in Forestry, to others only by special permission. Dr. JOHNSON. T Th 10. *Baker* 177.

Lectures. The chemistry of the manufacture of pulp and paper.

795. Research for Seniors. Throughout the year. Professor RHODES and Dr. JOHNSON. See page 17.

AGRICULTURAL CHEMISTRY

Students will not be allowed to register in courses in Agricultural Chemistry until after they have taken and passed Chemistry 101 and 105 or their equivalent.

805. Introductory Agricultural Chemistry (Fertilizers, Insecticides, Soils). First term. Credit two hours. Prerequisite, Chemistry 305 (or 375). Professor CAVANAUGH. T Th 11. *Baker 302.*

Lectures. The relation of chemistry to agriculture; an introduction to the study of plant growth, the composition and chemical properties of soils, fertilizers, amendments, insecticides, and fungicides.

810. Introductory Agricultural Chemistry. First term. Credit two hours. Prerequisite, Chemistry 205 and 220 (or 210 and 225). Professor CAVANAUGH, Mr. MISCALL, and assistant. Day and hour to be arranged. *Baker 350.*

Laboratory practice. Practice in the methods used by the chemist in the control laboratories of the factory, of the Government, and of the Experiment Stations, where fertilizers, insecticides, fungicides, and soils are examined.

815. Introductory Agricultural Chemistry (Foods and Feeds). Second term. Credit two hours. Prerequisite, Chemistry 305 (or 375). Professor CAVANAUGH. T Th 11. *Baker 302.*

Lectures. Discussion of the sources, chemical composition, and properties of the principal foods and feeds such as cereals, fruits, animal products, and dairy products. Relation of methods of preservation and manufacture to the nutritive value of foods.

820. Introductory Agricultural Chemistry. Second term. Credit two hours. Prerequisite, Chemistry 205 and 220 (or 210 and 225). Professor CAVANAUGH, Mr. MISCALL, and assistant. Day and hour to be arranged. *Baker 350.*

Laboratory practice. The methods of the Association of Official Agricultural Chemists are used in the examination and analysis of foods and feeding stuffs, such as milk and milk products, cereal products, canned vegetables, etc.

835. Advanced Agricultural Chemistry (Fertilizers, Insecticides, Soils). Either term. Credit two or more hours. Prerequisite, Chemistry 810. Professor CAVANAUGH and Mr. MISCALL. Day and hour to be arranged. *Baker 350.*

Laboratory practice. Advanced work in the chemistry of soils, fertilizers, plant composition, insecticides, or fungicides. Special topics may be selected.

840. Advanced Agricultural Chemistry (Foods and Feeds). Either term. Credit two or more hours. Prerequisite, Chemistry 820. Professor CAVANAUGH and Mr. MISCALL. Day and hour to be arranged. *Baker 350.*

Laboratory practice. Special topics in the chemistry of foods and food preparations.

***875. Elementary Agricultural Chemistry.** Second term. Credit three hours. Prerequisite, Chemistry 101. Professor CAVANAUGH. M W F 12. *Baker 377.* Candidates for the degree of Bachelor of Chemistry may not receive credit for this course toward the degree.

Lectures. The relation of chemistry to agriculture, and an introduction to the study of the composition and chemical properties of plants, fertilizers, feed stuffs, insecticides, and fungicides.

***880. Elementary Chemistry of Food Products.** Second term. Credit two hours. Prerequisite, Chemistry 101. Mr. MISCALL. W F 10. *Baker 377.* Candidates for the degree of Bachelor of Chemistry may not receive credit for this course toward the degree.

Lectures. The chemical composition, physical and physiological properties, sources, and methods of manufacture of the principal food products.

895. Research for Seniors. Throughout the year. Professor CAVANAUGH. See page 17.

SEMINARY

905. Seminary. Credit one hour. M 5. *Baker 107.*

For seniors who are candidates for the degree of Bachelor of Chemistry.

1000. Selected Topics in Chemistry. First term. Credit two hours. Professor PAUL WALDEN, University of Rostock, Germany. T Th 12. *Baker 107.*

Professor Walden will also hold a Colloquium on Wednesday at 4:30 p. m. Seniors in the course in chemistry may elect these lectures, and juniors may do so on special permission.

THE CLASSICS

ARCHAEOLOGY, GREEK ART AND ANTIQUITIES

1. **History of Greek Sculpture.** Repeated in second term. Credit three hours. Professor ANDREWS. First term, M W F 9; second term, M W F 11. *Goldwin Smith Museum of Casts.*

Intended to be supplemented by course 3, but may be taken separately.

3. **Greek Antiquities.** Repeated in second term. Credit three hours. Professor ANDREWS. First term, M W F 11; second term, M W F 9. *Goldwin Smith Museum of Casts.*

Pre-Greek art and civilization; Greek terra cottas, bronzes, pottery, and gems. Illustrated by the material in the Museum of Casts and by stereopticon views. Intended to be taken with course 1, but may be taken separately.

4a. **Greek Coins.** First term. Credit two hours. Professor ANDREWS. T Th 11. *Goldwin Smith Museum of Casts.*

4b. **Greek Architecture.** Second term. Credit two hours. Professor ANDREWS. T Th 11. *Goldwin Smith Museum of Casts.*

5. **Pausanias.** Throughout the year. Credit two hours a term. Prerequisite, facility in reading Greek. Professor ANDREWS. Hours to be arranged after consultation. *Goldwin Smith 35.*

A reading course in the sources of knowledge of Greek topography with special reference to Athens, supplemented by illustrated lectures and by reading from Thucydides and Herodotus.

6. **Greek Epigraphy.** Credit two hours. Prerequisite, facility in reading Greek. Professor ANDREWS. Hours to be arranged after consultation. *Goldwin Smith 35.*

A study of Greek alphabets and inscriptions, chiefly from the large collection of squeezes owned by the department. For graduates and qualified undergraduates.

7. **Modern Greek.** Credit two hours. Prerequisite, facility in reading Greek. Professor ANDREWS. Hours to be arranged after consultation. *Goldwin Smith 35.*

Primarily for those expecting to study in Athens. The literary language and the colloquial idiom. Athenian newspapers and stories in the vernacular will be read.

GREEK

*1a. **Greek for Beginners: Introduction to Homer's Iliad.** Repeated in second term. Credit three hours. First term: Section 1, Assistant Professor CAPLAN, M W F 12, *Goldwin Smith 124*; Section 2, Mr. ———— T Th S 11, *Goldwin Smith 124*. Second term: Section 1, Assistant Professor CAPLAN, M W F 12, *Goldwin Smith 124*; Section 2, Professor JONES, T Th S 11, *Goldwin Smith 124*.

*1b. **Homer's Iliad.** Continuation of Greek 1a. Repeated in second term. Credit three hours. Prerequisite, Greek 1a. First term: Professor JONES, M W F 10, *Goldwin Smith 120*. Second term, Mr. ————, M W F 12, *Goldwin Smith 120*.

*2a. **Attic Greek: Plato, Selected Dialogues.** Repeated in the second term. Credit three hours. Prerequisite, Greek 1b. First term, Professor JONES. M W F 9. *Goldwin Smith 128*. Second term, Mr. ————. M W F 10. *Goldwin Smith 124*.

*2b. **Euripides, Iphigenia in Tauris; Lucian.** Second term. Credit three hours. Prerequisite, Greek 2a. Professor JONES. M W F 10. *Goldwin Smith 120*.

4. **Greek Composition.** Throughout the year. Credit one hour. Prerequisite, Greek 1b or its equivalent. Assistant Professor CAPLAN. T 12. *Goldwin Smith 124*.

[7. **Myths of the Epic Cycle.** Second term. Credit two hours. Professor JONES. Not given in 1927-28.]

17. **Aristophanes, Clouds; Lysias; Sophocles, Oedipus Rex, Antigone.**

Throughout the year. Credit three hours a term. Prerequisite, Greek 2b. Professor MOUNTFORD. T Th S 11. *Goldwin Smith* 120.

20. **Lyric Poetry; Aeschylus, Prometheus Vincit; Theocritus; Demosthenes, De Corona.** Throughout the year. Credit three hours a term. Prerequisite, Greek 17. Professor JONES. T Th S 12. *Goldwin Smith* 128.

25. **Advanced Greek Composition.** Throughout the year. Credit one hour a term. Prerequisite, Greek 4. Professor MOUNTFORD. M 12. *Goldwin Smith* 134.

[30. **Lectures on Greek Literature: Greek Tragedy and Comedy.** First term. Credit two hours. Professor MOUNTFORD. Not given in 1927-28.]

31. **Lectures on Greek Literature: Epic and Lyric Poetry.** First term. Credit two hours. Professor MOUNTFORD. W F 12. *Goldwin Smith* 120.

Open to those who have taken or are taking Greek 1b. Other students will be admitted by permission of the instructor.

33. **Classical and Mediaeval Rhetoric.** Throughout the year. Credit two hours a term. Admission by consent of instructor; not open to underclassmen. Assistant Professor CAPLAN. M 2:30-4:30. *Goldwin Smith* 124.

A study of rhetorical theories and of oratorical practice, and their influence on modern rhetoric and eloquence.

35. **The Republic of Plato.** Throughout the year. Credit three hours a term. Professor HAMMOND. See Philosophy, Course 27.

[40. **Greek Seminary.** Professor JONES. Not given in 1927-28.]

English Translations of Greek and Latin Classics. Professor COOPER. See Comparative Study of Literature, course 1.

Methods of Literary and Linguistic Study. Professor COOPER. See Comparative Study of Literature, course 5.

Greek History. Professor LAISTNER. See History, courses 1 and 3.

LATIN

*1a. **Freshman Course: for students offering three units of entrance Latin.** Throughout the year. Credit three hours a term. Mr. ——— M W F 9. *Goldwin Smith* 124.

Ovid; Virgil; Horace, Odes and Epodes.

*1. **Freshman Course: for students offering four units of entrance Latin.** Throughout the year. Credit three hours a term. Section 1, Professor DURHAM, M W F 10, *Goldwin Smith* 128; Section 2, Professor MOUNTFORD, T Th S 9, *Goldwin Smith* 120; Section 3, Assistant Professor CAPLAN, M W F 11, *Goldwin Smith* 120.

Cicero, De Senectute; Martial, Epigrams; Horace, Odes and Epodes.

*2. **Sight Translation: Gellius; Ovid.** Throughout the year. Credit one hour a term. Professor ELMER. Th 2. *Goldwin Smith* 124.

Especially recommended as collateral work for those who are taking Course 1 or 1a, but open to all students. Courses 2 and 3 are given in alternate years.

[3. **Sight Translation: Caesar, Civil War; Phaedrus.** Professor ELMER. Not given in 1927-28.]

[7. **Classic Myths in English Literature.** First term. Credit two hours. Professor DURHAM. Not given in 1927-28.]

*8. **Terence; Horace, Satires and Epistles; Tacitus, Agricola; Virgil, Georgics; Catullus; Livy; Seneca, Epistles; Latin Elegy; Martial.** Throughout the year. Credit three hours a term. Prerequisite, Latin 1 or 1a. Professor DURHAM. T Th S 9. *Goldwin Smith* 128.

These works are divided into two groups given in alternate years.

[11. **Selections from Cicero's Letters; Cicero, De Oratore, Book I.** Throughout the year. Credit two hours a term. Professor ELMER. Not given in 1927-28.]

12. **Selections from the last Six Books of Virgil's Aeneid; Cicero, De Officiis.** Throughout the year. Credit two hours a term. Prerequisite, Latin 1 or 1a. Professor ELMER. W F 11. *Goldwin Smith* 124.

[16. **The Greater Republican Writers.** Throughout the year. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Professor DURHAM.]

17. **Literature and History of the Early Empire.** Throughout the year. Credit three hours a term. Prerequisites Latin 8, 11, or 12. Professor ELMER. T Th S 10. *Goldwin Smith* 124.

Tacitus, Annals; Juvenal; Pliny's Letters; Suetonius.

21. **Latin Writing, Intermediate Course.** Throughout the year. Credit one hour a term. Prerequisite, Latin 1 or 1a. Professor ELMER. M 12. *Goldwin Smith* 128.

Recommended to sophomores.

[26. **Teachers' Training Course.** Throughout the year. Credit two hours a term. Professors ELMER and DURHAM. Not given in 1927-28.]

[27. **Topography and Architectural Remains of Rome.** Second term. Credit two hours. Professor DURHAM. Not given in 1927-28.]

[30. **Lectures on Roman Literature: The Republican Period.** First term. Credit two hours. Professor DURHAM. Not given in 1927-28.]

31. **Lectures on Roman Literature: Ovid to Boethius.** Second term. Credit two hours. Professor MOUNTFORD. W F 12. *Goldwin Smith* 128.

Open to those who have taken or are taking Latin 8, 11, or 12. Other students will be admitted by permission of the instructor.

33. **Classical and Mediaeval Rhetoric.** Throughout the year. Credit two hours a term. Admission by consent of the instructor; not open to underclassmen. Assistant Professor CAPLAN. M 2:30-4:30. *Goldwin Smith* 124.

A study of rhetorical theories and of oratorical practice, and their influence on modern rhetoric and eloquence.

39. **Latin Seminary: The MS Tradition of Cicero's Oratorical Works.** Throughout the year. For graduates only. Professor DURHAM. W 2:30. *Library, Classical Seminary Room.*

[40. **Latin Seminary: Virgil.** Throughout the year. Professor ELMER. Not given in 1927-28.]

[41. **Latin Seminary: Horace.** Throughout the year. Professor MOUNTFORD. Not given in 1927-28.]

45. **Latin Writing. Advanced Course.** Throughout the year. Credit one hour a term. Professor ELMER. T 2. *Goldwin Smith* 124.

For graduates and undergraduates who have taken Latin 21.

[48. **Vulgar Latin: Petronius, Cena Trimalchionis; Vulgar Latin Inscriptions, including Christian Inscriptions.** Second term. Credit two hours. Professor DURHAM. Not given in 1927-28.]

[49. **Indo-European Philology; Sounds and Flexions of Latin; Italic Dialects.** Throughout the year. Credit two hours. Professor DURHAM. Not given in 1927-28.]

[50. **Latin Epigraphy.** Second term. Credit two hours. Professor DURHAM. Not given in 1927-28.]

Roman History. Professor LAISTNER. See History, Courses 1 and 14.

COMPARATIVE STUDY OF LITERATURE

1. **English Translations of Greek and Latin Classics.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen. Professor COOPER. T 3; Th 3-5. *Goldwin Smith* 236.

Rapid reading in the best translations, with emphasis upon Greek masterpieces; for example, the Iliad and the Odyssey, the tragedies of Sophocles, and several dialogues of Plato. Translations from the Latin will be chosen for the bearing of the original works upon modern literature. Students wishing to take the course must consult the instructor in advance.

2. **Old and Middle English.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen, and to graduate students by special permission. Professor COOPER. M W F 10. *Goldwin Smith* 164.

A study of the foundations of the English language and literature, with emphasis upon literary aspects so far as a proper acquisition of linguistic knowledge shall permit. The work of the second term deals partly with Chaucer. Students may be admitted at the beginning of either term after consultation with the instructor.

The course will be of service to prospective teachers in the secondary schools.

3. **Principles of Literary Criticism.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. W 3-5, and another hour to be arranged. *Goldwin Smith* 236.

A study of the chief theories of poetry, and chief kinds of literature, with illustrations drawn from writers both ancient and modern.

This and the following courses are mainly designed for prospective college and university teachers.

4. **Dante in English.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. M 3-5:30. *Goldwin Smith* 236.

Reading for the sake of literary and historical perspective, followed by a study of the *Divine Comedy* in the best English translations.

5. **Methods of Literary and Linguistic Study.** Throughout the year. Credit three hours a term. Open to graduate students only. Professor COOPER. Not given in 1927-28.]

6. **Chaucer Seminary.** Throughout the year. For graduate students only. Professor COOPER. Wednesday 7:30 p. m. *English Seminary Room*.

A survey of books and topics that are essential to the study of Chaucer and his age; systematic reading of his works; a detailed examination of significant problems.

ECONOMICS

Course 1 or its equivalent—e. g., course 81 for mature or graduate students—must be completed before any credit may be obtained toward the upperclass requirement.

To satisfy the upperclass requirement in Economics a student must complete (1) Course 1 or its equivalent; (2) a minimum of five hours in each of three groups other than the introductory group; (3) twenty hours in Economics, completed after attaining upperclass status.

A student who is excused from ten of the required twenty hours in an upperclass group must complete (1) course 1 or its equivalent; (2) a minimum of five hours in each of two groups, or of three hours in each of three groups other than the introductory group; (3) ten hours in Economics completed after attaining upperclass status.

Certain courses in Agricultural Economics may be counted in partial fulfillment of the major requirement in Economics, but in no case may more than six of the required twenty hours be allowed for such courses; and, in each case, the specific approval of the adviser must be obtained before credit for such courses may be counted toward the upperclass requirement. Students must secure the approval of their adviser, and the permission of the Dean and of the instructor in charge of the course, before they may register for courses given outside the College.

The attention of students intending to elect Economics as their upperclass group is directed to the following courses in Government, History, and Philosophy: History of Political Thought; English History, American History, Economic History of the United States, History of Modern Europe, The Intellectual History of Modern Times; Problems of Philosophy, History of Philosophy, Social and Political Ethics.

INTRODUCTORY COURSES

*1. **Modern Economic Society.** Repeated in second term. Credit five hours. Professor SLICHTER. Daily except S 8, 9, 10, 11, 12, 2.

A survey of the existing economic order, its more salient and basic characteristics, and its operation.

In the first term, the enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days at *Goldwin Smith* 260.

*2a. **Modern Economic Society.** First term. Credit three hours. Professor SLICHTER. M W F 8, 9, 11; T Th S 8, 9, 11.

This course and course 2b cover the same subject matter as course 1.

Enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days in *Goldwin Smith* 260.

*2b. **Modern Economic Society.** Second term. Credit three hours. Prerequisite course 2a. Professor SLICHTER. M W F 8, 9, 11. T Th S 8, 9, 11.

Continuation of course 2a.

*3. **Introduction to Economics.** For students in Engineering and Chemistry. Repeated in second term. Credit three hours. Professor SLICHTER. Hours to be announced.

An introduction to the more essential outlines of contemporary economic organization and to a number of economic problems about which a citizen in American society is required to formulate or express his opinions.

*5. **Current Economic Problems.** Second term. Credit three hours. Prerequisite, Economics I or its equivalent. Professor SLICHTER. M W F 8, 9, 10; T Th S 8.

A continuation of Course I or 2, designed to afford students an opportunity to become acquainted in a general way with the more important economic problems of the day—tariff problems, reparations problems, railroad problems, trust problems, labor problems, problems of the farmer, conservation problems, and problems of taxation and public finance.

Assignment to sections will be made on registration days in *Goldwin Smith* 259.

FINANCE

11. **Money and Banking.** Repeated in second term. Credit five hours. Prerequisite, Economics I or its equivalent. Professor REED. First term, daily except S 10. *Goldwin Smith* 142. Second term, daily except S 11. *Goldwin Smith* 142.

A study of the history and the theory of money and banking.

Enrollment limited to seventy-five students.

12. **Money, Credit, and Foreign Exchange.** Second term. Credit three hours. Prerequisite, Economics 11. Consult the instructor before registering. Professor REED. T Th S 9. *Goldwin Smith* 264.

A critical discussion of some selected phases of monetary theory.

13. **Corporation and Investment Finance.** First term. Credit three hours. Prerequisite, Economics 11 and 21a. Professor ENGLISH and Mr. O'LEARY. M W F 9. *Goldwin Smith* 256.

A study of the financial problems of the business corporation from the points of view of the management and of the investor.

15. **Cyclical Analysis.** First term. Credit three hours. Prerequisite, Economics 11. Professor REED. T Th S 9. *Goldwin Smith* 264.

Theoretical and historical interpretations of crises and depressions; their economic significance and methods of forecasting.

The attention of students is called to the following related work: Agricultural Statistics, Agricultural Prices, Corporation Law, Introduction to Mathematics of Finance, Theory of Probability.

ACCOUNTING

21a. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics I or its equivalent. Professor ENGLISH and Mr. HUDGINS. First term, M W F 8, *Goldwin Smith* C; second term, M W F 10, *Goldwin Smith* C. One practice period a week, *Goldwin Smith* 329.

Theory of debit and credit; the journal and ledger; the development of books of original entry; analysis of income sheets and balance sheets.

21b. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics 21a. Professor ENGLISH and Mr. HUDGINS. First term, T Th S 8, *Goldwin Smith* 256; second term, M W F 8, *Goldwin Smith* 256. One practice period a week, *Goldwin Smith* 329.

The issue and transfer of capital stock, bonds and their valuation, depreciation, reserves and reserve funds, sinking funds, analysis of income sheets and balance sheets.

25. **Cost Accounting.** First term. Credit two hours. Prerequisite, Economics 21b. Professor ENGLISH. T Th 9. *Goldwin Smith* 256.

The purposes and methods of determining manufacturing costs.

26. Accounting Theory and Problems. Second term. Credit three hours. Prerequisite, Economics 21b, or its equivalent. Professor ENGLISH. M W F 9. *Goldwin Smith* 256.

A critical study of the fundamental principles underlying accounting procedure. The solution of typical problems in corporate consolidation, reorganization, and liquidation, and in other special fields.

29. Special Problems in Accounting. Throughout the year. Credit one or two hours a term. Consult the instructor. Professor ENGLISH.

The theoretical study and the solution of selected problems.

The attention of students is called to the following related work: Introduction to the Mathematics of Finance, The Law of Contracts, Corporation Law, Partnership Law.

PUBLIC REGULATION OF INDUSTRY AND TRADE

31. Transportation and Communication. Second term. Credit three hours. Open to upperclassmen who have credit for Economics 21a. Assistant Professor COPELAND. M W F 10. *Goldwin Smith* 256.

Public policy in methods of organization and administration of basic industries. Topic for 1927-28, The Railroad Industry.

35. Trusts and Modern Capitalism. First term. Credit three hours. Prerequisite, Economics 31 or consent of the instructor. Assistant Professor COPELAND. M W F 9. *Goldwin Smith* 264.

A study of commercial and industrial organization, with special attention to the economic significance of the so-called steel, coal, petroleum, beef, and money trusts, and to public policy in dealing with them.

The attention of students is called to the following related work: American Government, Social and Political Ethics, Marketing, Law of Public Service and Carriers, Law of Restraints on Business and Industry.

LABOR AND INDUSTRIAL RELATIONS

43. Trade Unionism in the United States. First term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Professor SLICHTER. M W F 9. *Goldwin Smith* 142.

A study of the origins, development, philosophies, aims, and policies of American trade unionism with special reference to the factors which have determined the character of the American labor movement and with emphasis on current problems of unionism and on present trends in union policies. A special materials fee of \$1.50 is charged for use of books and pamphlets in the Industrial Relations Library.

44. The State in Relation to Labor. Second term. Credit three hours. Consult the instructor before registering. Professor SLICHTER. M W F 9. *Goldwin Smith* 142.

An examination of the efforts of the State to assist in the solution of the labor problem. Conciliation, arbitration, industrial courts, the legal minimum wage, workmen's compensation, labor exchanges, social insurance, administrative machinery and problems.

47. Industrial Government. Second term. Credit three hours. Consult the instructor before registering. Professor SLICHTER. Hours to be arranged.

An intensive examination of problems arising from the participation of labor in the government of industry. Evolution of trade agreements and experience under representative trade agreements will be studied in some detail, and an examination will be made of some of the more important untried proposals.

49. Research in Industrial Relations. Throughout the year. Credit two hours a term. Consult the instructor before registering. Professor SLICHTER. Hours to be arranged.

Discussions and individual investigations of current and theoretical problems in the field of industrial relations.

The attention of students is called to the following related work: Elementary Social Science, Constitutional History of the United States, Political Institutions,

The American Federal System, Fundamental Rights and Immunities, Social and Political Ethics, Constitutional Law, Law of Restraints on Business and Industry.

SOCIAL SCIENCE

50a. **Introduction to Sociology.** First term. Credit three hours. Acting Assistant Professor WOODWARD. T Th 9 and an hour to be arranged. *Goldwin Smith* 134.

An elementary study of social groups and institutions; their origin, structure, and functioning.

50b. **Introduction to Sociology.** Second term. Credit three hours. Prerequisite, Economics I or 50a. Acting Assistant Professor WOODWARD. T Th 9 and one hour to be arranged. *Goldwin Smith* 134.

Application of social theory to problems of modern society.

53a. **Primitive Society.** First term. Credit three hours. Consult instructor before registering. Professor ———. T Th S 11. *Goldwin Smith* 264.

A descriptive and analytical study of primitive culture.

53b. **Social Evolution.** Second term. Credit three hours. Prerequisite, Course 53a or the consent of the instructor. Professor ———. T Th S 11. *Goldwin Smith* 264.

Continuation of Course 53a with special reference to the development of social institutions in ancient and modern civilization.

57a. **Human Nature and the Social Order.** First term. Credit two hours. Consult the instructor before registering. Assistant Professor COPELAND. Hours to be arranged.

Theories of social and economic psychology and of the relations between individual human nature and our present social and economic system.

[57b. **Social Evolution.** Second term. Credit two hours. Assistant Professor COPELAND. Not given in 1927-28.]

The attention of students is called to the following related work: Rural Sociology, Family Income and Expenditure, The Place of the Household in Society, The Family, Biology of the Human Species, Genetics, Political Institutions, and General Psychology.

STATISTICS

75. **American Population Problems.** Second term. Credit three hours. Prerequisite, Economics I or its equivalent. Professor WILLCOX. M W F 11. *Goldwin Smith* 259.

A survey of the composition of the population of the United States and of current changes in it as revealed by statistics, federal and state.

77. **Laboratory in Statistical Methods.** First term. Credit three hours. Prerequisite, Economics I or equivalent. Assistant Professor COPELAND. M W F 11-1. *Goldwin Smith* 329.

Problems illustrating the elementary methods of analyzing, summarizing, and interpreting numerical data which are currently employed in economic and business investigations.

78. **History and Statistics of Immigration into the United States.** Second term. Credit two hours. Open by permission to students who are majoring in Economics or American History. Professor WILLCOX. Tuesday 4-6. *Goldwin Smith* 259.

ECONOMIC THEORY

81. **Principles of Economics.** First term. Credit five hours. Consult the instructor. Professor DAVENPORT. Daily except S 10. *Goldwin Smith* 264.

Intermediate theory, primarily for students majoring in economics who have had, preferably, one or two years of work in advance of course I; or for graduate students; or for the more mature students desiring an introductory course more searching and difficult than course I.

82. **Public Revenues.** Second term. Credit five hours. Primarily for advanced students. Professor DAVENPORT. Daily except S 10. *Goldwin Smith* 264.

The limits of state activity; justice in taxation; proportion vs. progression;

problems of incidence; administrative aspects of income taxation; franchise and corporate taxation; the articulation of various taxes.

84. The Price System. Second term. Credit two hours. Consult the instructor before registering. Assistant Professor COPELAND. Hours to be arranged.

A tentative effort to treat economic value theory from an institutional standpoint, employing methods drawn from physical and biological science, including statistical technique.

89. Value and Distribution. Throughout the year. Credit six hours on completion of the course. Primarily for graduates. Professor DAVENPORT. Hours to be arranged.

The chief problems of current economic theory. The leading economic writers will be critically studied with a view to disclosing the basis of existing divergences.

The attention of students is called to the following related work: Political Philosophy and Science; Social and Political Ethics; Ethics of Modern Utilitarianism, General Psychology, Constitutional Law, the Law of Taxation.

INFORMAL STUDY AND HONORS IN ECONOMICS

The direction of informal study in economics, and the assistance of candidates for the degree with honors in economics is in charge of Assistant Professor COPELAND. Qualified seniors may register for informal study for which from one to three hours of credit each term will be granted, but such registration must have the approval of Professor Copeland and the student's upperclass adviser.

EDUCATION

Psychology I, Ia, or Ib, is prerequisite to all courses in Education.

1. Educational Psychology. Repeated in second term. Credit three hours. Lectures and recitations. First term. Dr. FREEMAN and Dr. BRUCE. M W F 11. Second term, Professor OGDEN and Dr. FREEMAN. M W F 10. *Goldwin Smith* 134 and 234.

A study of functional psychology with special reference to the learning process and its application to educational theory and practice. Students must apply to *Goldwin Smith* 251 for assignment to sections.

2. Principles of Secondary Education. Second term. Credit three hours. Prerequisite, Education I. Section I, M W F 2. Professor JORDAN. *Goldwin Smith* 234. Section II, T Th S 12. Dr. FREEMAN. *Goldwin Smith* 234.

The nature and significance of education; biological and psychological foundations; the secondary school as a social institution; educational ideas and values; the curriculum; administration and general methods. Students who elect Course 2 must apply at *Goldwin Smith* 248 for assignment to sections.

3. History of Education. (a) (Greek, Roman, and Early Medieval.) First term. Credit two hours. Open to upperclassmen and graduates only. T and Th 10. *Goldwin Smith* 234. Professor LAISTNER. (See History 7.) (b) (Medieval and Modern). Second term. Credit two hours. Open to upperclassmen and graduates only. T and Th 10. *Goldwin Smith* 234. Professor SMITH. (See History 29.)

4. Method and Procedure in High School Teaching. First term. Credit three hours. For seniors only. Professor JORDAN. M W F 11; M W F 3. *Goldwin Smith* 256.

Designed for students who expect to teach in secondary schools. The relation and duties of high school teachers to their students, to the community, and to the state; methods of class management and types of recitation. Observation of actual high school classes required.

4a. Observation and Practice in High School Method. First term. Credit one hour. For seniors only. Professor JORDAN and Dr. BRUCE. M 4. *Goldwin Smith* 256.

Planned to be taken coincidentally with course 4, and required of students desiring to meet the New York State requirements for the provisional professional certificate.

5. **Philosophy of Education.** Second term. Credit two hours. Prerequisite, Education 1 and at least one course in Philosophy. Professor OGDEN. W 2-4. *Goldwin Smith* 248.

A study of education as interpreted by the more important philosophical conceptions and theories, with special application to the spirit and demands of modern society.

6. **Experimental Education.** Second term. Credit two hours. Prerequisite, Education 1 and Psychology 3, or consent of the instructor. Dr. FREEMAN. T Th 2-4:30. *Goldwin Smith* 248.

The chief problems of experimental education; the application of psychological and statistical methods to problems in educational psychology; chief results and practical bearings.

7. **Mental and Educational Measurements.** First term. Credit three hours. Prerequisite, Education 1 and permission of the instructor. Dr. FREEMAN. T Th 9. *Goldwin Smith* 236. Laboratory hours to be arranged.

The nature of intelligence. The history of the development of individual and group tests of intelligence; principles underlying their formation and application; the use of tests of intelligence in dealing with defective and superior children, and with problem cases; their use in general school problems. The theory, construction, and use of educational tests. Experience in administering tests.

8. **Experimental Investigation.** Repeated in second term. Credit and hours to be arranged. Prerequisite, Education 6 or 7. Professor OGDEN and Dr. FREEMAN. Day and hour to be arranged. *Goldwin Smith* 251.

Experimental study of a special problem in educational psychology or in mental measurements.

9. **Reading of German Educational Psychology.** First term. Credit two hours. Prerequisite, Education 1. Professor OGDEN. W 4-6. *Goldwin Smith* 248.

The aim of the course is to aid in facility of translation and to familiarize the student with certain monographic literature.

10. **City School Administration and Supervision.** Throughout the year. Credit two hours a term. Prerequisite, Education 1. Professor JORDAN. M W 9. *Goldwin Smith* 248.

Principles of administration and supervision of state and city school systems, involving problems of evaluation and improvement of teaching, and of the subject matter in the public schools. The course will be adapted to the particular needs of the class.

[12. **The Junior High School.** Throughout the year. Credit two hours. For seniors, graduates, and other qualified students. Professor JORDAN. W 4-6. *Goldwin Smith* 234. Not given in 1927-28.]

13. **History of American Education.** First term. Credit three hours. Prerequisite, Education 1. Dr. BRUCE. T Th S 8. *Goldwin Smith* 128.

The origin and development of American educational movements and institutions, with special emphasis on public education and the social, religious, economic, and political factors influencing its functioning. Brief consideration will be given to European educational background in relation to early American Education.

16. **Readings in the History of Education.** Second term. Credit three hours. Prerequisite, Education 1 and 3, or by permission of the instructor. Dr. BRUCE. T Th S 9. *Goldwin Smith* 248.

17. **Mental Development.** First term. Credit two hours. Prerequisite, Education 1. Professor OGDEN. T 2-4. *Goldwin Smith* 248.

A course in child psychology, dealing with the facts of mental growth and their interpretation.

20. **Seminary in Education.** First term. Credit two hours. Prerequisite, Education 1. Professor OGDEN. M 4-6. *Goldwin Smith* 248.

Topics relevant to the fundamental assumptions of educational theory will be chosen. Primarily for graduate students.

21. **Seminary in Education.** Second term. Credit two hours. Admission by permission of the instructor. Professor JORDAN. M 4-6. *Goldwin Smith* 248.

Topics developing from historical and current problems of educational practice,

especially as related to administration and conduct of the public school system and of the university. Primarily for graduate students.

The attention of students is called to the announcement of the Division of Education.

ENGLISH

COURSES FOR FRESHMEN

***1. Elementary Composition and Literature.** Throughout the year. Credit three hours a term. Messrs. BALDWIN, JOHNSON, ELSON, AINSWORTH, BISSELL, and BUCHANAN. M W F 8, 9, 10, 11, 12; T Th S 8, 9, 12. Rooms to be announced.

This course is designed for underclassmen in Agriculture, Architecture, and Chemistry who have satisfied the entrance requirements in English. A study of composition in connection with the reading of representative works in English literature. Students who have not taken the course in the first term may enter in the second term in sections provided for them.

Registration in the course is in charge of Mr. Baldwin. Students who elect English 1 must apply at *Roberts 292* on Monday, Tuesday, or Wednesday of registration week for assignment to sections.

***3. Introductory Course.** Throughout the year. Credit three hours a term. Assistant Professor SMITH, Messrs. FRENCH, VAN ALLEN, MARX, MITCHELL, KESSEL, LINDSAY, and MULLER. M W F 8, 9, 10, 11, 12; T Th S 8, 9, 10, 11. Rooms to be announced.

Chaucer, Shakespeare, Milton, Pope, Goldsmith, Browning, Thackeray; practice in composition, with conferences. Designed for freshmen who are candidates for the degree of Bachelor of Arts. Students who elect English 3 must apply at *Goldwin Smith A* on Monday, Tuesday, or Wednesday of registration week for assignment to sections. The course is in charge of Professor Smith.

***4. Introduction to Poetry.** Throughout the year. Credit one hour a term. Open only to freshmen enrolled in English 1 or 3. Professor SAMPSON. S 12. *Goldwin Smith A*.

Lectures on English poetry with assigned readings.

COURSES FOR SOPHOMORES

***20. Nineteenth Century Prose.** Throughout the year. Credit three hours a term. Prerequisite, English 1 or 3. M W F 9, Assistant Professor FISKE, *Goldwin Smith 164*; M W F 10, Assistant Professor BROUGHTON, *Goldwin Smith 160*; M W F 11, Assistant Professor MONROE, *Goldwin Smith 164*; M W F 12, Professor SIBLEY, *Goldwin Smith 164*; T Th S 9, Mr. BALDWIN, *Goldwin Smith 164*; T Th S 10, Assistant Professor MONROE, *Goldwin Smith 164*; T Th S 11, Assistant Professor FISKE, *Goldwin Smith 164*; T Th S 12, Dr. FRENCH, *Goldwin Smith 164*.

Reading of nineteenth century prose; practice in composition. In the first term particular attention will be paid to formal instruction in composition in Professor Monroe's section, T Th S 10, and in Dr. French's section, T Th S 12.

***21. Composition and Literature.** Throughout the year. Credit two hours a term. Assistant Professor FISKE and Messrs. VAN ALLEN, FRENCH, LINDSAY, and JOHNSON. Hours and rooms to be arranged.

Reading of masterpieces, and practice in composition, with conferences. Open only to students in the College of Engineering. Registration is in charge of the College of Engineering.

***22. Nineteenth Century Poetry.** Throughout the year. Credit three hours a term. Prerequisite, English 1 or 3. Professor SAMPSON. Conferences with Mr. KESSEL. M W F 11. *Goldwin Smith A*.

Wordsworth, Coleridge, Byron, Shelley, and Keats.

ADVANCED COURSES FOR UPPERCLASSMEN AND GRADUATES

32. History of English Literature. Throughout the year. Credit three hours a term. Prerequisite, two years of English. Professor STRUNK. T Th S 10. *Goldwin Smith 156*.

Lectures on English literature, with reading and reports.

34. **Chaucer.** Throughout the year. Credit three hours a term. Open to seniors and graduates. Professor STRUNK. T Th 3. *Goldwin Smith* 164.

First term: Chaucer's life, times, and contemporaries; the minor poems. Second term: the Canterbury Tales.

35. **Biography.** First term. Credit two hours. Open to upperclassmen. Assistant Professor SMITH. T Th 3. *Goldwin Smith* 134.

Boswell's Johnson, Gibbon, Borrow.

37. **Shakespeare.** Throughout the year. Credit three hours. Prerequisite, two years of English. Professor STRUNK. M W F 10. *Goldwin Smith* 156.

First term: comedies; second term: tragedies.

38. **Eighteenth Century Poetry.** Throughout the year. Credit two hours a term. Open to upperclassmen. First term: Assistant Professor Monroe. T Th 12. *Goldwin Smith* 156. Second term: Professor PRESCOTT. T Th 12. *Goldwin Smith* 156.

English poets of the Restoration and the eighteenth century; Dryden, Pope, Thomson, Gray, Collins, Goldsmith, Cowper, and Burns; the lesser English and Scotch poets; beginnings of the English Romantic movement.

39. **Nineteenth Century Prose.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Assistant Professor BROUGHTON. T Th S 9. *Goldwin Smith* 142.

A study of the leading prose writers of the century: Defoe, Swift, Addison, Steele, Goldsmith, Johnson, Burke, the early novelists, and others.

40. **Nineteenth Century Prose.** Throughout the year. Credit two hours a term. A student may not receive credit for both English 20 and 40. Open to upperclassmen and graduates. Assistant Professor BROUGHTON. F 4-6. *Goldwin Smith* 160.

Extensive reading in nineteenth century prose, with some attention to the literary criticism and theories of style of the period; frequent reports and a term essay.

41. **The English Drama to 1642.** Throughout the year. Credit three hours a term. Prerequisite, twenty-four hours of University credit with a grade of A or B. Assistant Professor HEBEL. M W F 11. *Goldwin Smith* 142.

First term: the origin of the drama; miracles, moralities; interludes; the first regular comedies and tragedies. Second term: the contemporaries and successors of Shakespeare.

[44. **Shakespeare.** First term. Credit three hours. Prerequisite, twenty-four hours of University credit with a grade of A or B. Professor ADAMS. M W F 12. *Goldwin Smith* B. Not given in 1927-28.]

45. **The English Novel.** Throughout the year. Credit two hours a term. Open only to upperclassmen who have passed twelve hours of English with a grade of A or B. Students may enter in the second term. First term: Assistant Professor FISKE; second term: Professor SAMPSON. T Th 12. *Goldwin Smith* 142.

First term: the growth of the English novel, from Defoe to Dickens. Lectures, recitations and a considerable amount of reading in Fielding, Richardson, Smollett, Scott, Jane Austen, and others. Second term: a detailed study of representative works of recent novelists: Hardy, Meredith, James, Conrad, and others.

46. **Byron and Shelley.** First term. Credit two hours. Open to upperclassmen who have passed twelve hours of English with a grade of A or B. Professor PRESCOTT. T Th 2. *Goldwin Smith* 156.

In 1927-28: A study of Shelley's life, his principal works, and his influence.

47. **English Poetry.** Throughout the year. Credit three hours a term. Open to upperclassmen after consultation with the instructor. Professor PRESCOTT. M W F 10. *Goldwin Smith* 162.

A general course in the nature of poetry and of poetic forms with reading of illustrative poems.

48a. **American Literature.** First term. Credit three hours. Open to seniors and graduates. Professor PRESCOTT. M W F 12. *Goldwin Smith* 156.

American literature of the colonial and revolutionary periods; the growth of literary independence; Irving, Bryant, and Cooper.

48b. **American Literature.** Second term. Credit three hours. Prerequisite, English 48a. Open to seniors and graduates. Professor PRESCOTT. M W F 12. *Goldwin Smith* 156.

American prose and poetry of the nineteenth century.

[49. **Pastoral Poetry.** Throughout the year. Credit two hours a term. Open to upperclassmen and graduates. Assistant Professor BROUGHTON. T Th 10. *Goldwin Smith* 160.

A study of the sources and development of the appreciation of rustic life and landscape in poetry from Theocritus to recent writers. Not given in 1927-28.]

50. **Spenser and Milton.** Throughout the year. Credit two hours a term. Open to upperclassmen and graduates. Assistant Professor HEBEL. T Th 10. *Goldwin Smith* 134.

First term: A study of the poetry of Spenser with such survey of his immediate predecessors and contemporaries as is necessary for an understanding of his historical position. Second term: Milton's poetry and selections from his prose.

51. **Seventeenth Century Literature.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Students may not enter in the second term. Assistant Professor HEBEL. T Th S 11. *Goldwin Smith* 134.

A study of English literature, history, and philosophy of the seventeenth century; Bacon, Donne, Herbert, Vaughan, Traherne, Johnson, Herrick, Carew, Suckling, Burton, Browne, Walton, Digby, Hobbes, Evelyn, Pepys.

52. **Victorian Literature.** Throughout the year. Credit three hours a term. In general no credit is given until the student has completed the year's work. At the beginning of the second term no juniors are admitted and no others except by special permission. Open to upperclassmen and graduates. Professor NORTHUP. T Th S 9. *Goldwin Smith* 156.

Lectures on the chief characteristics and literary tendencies of the period; studies of the leading poets and the greater writers of prose, including fiction.

53. **Old English.** Throughout the year. Credit three hours a term. Assistant Professor MONROE. M W F 9. *Goldwin Smith* 162.

Old English grammar. Reading of selections from the Old English Chronicle, King Alfred, Aelfric, and other representative prose texts, and of the simpler poetry. A part of the second term is devoted to early Middle English, with supplementary reading on the growth of the language.

This course is recommended by the Department to those intending to teach English.

54. **Old English Literature.** Second term. Credit two hours. Open to graduates and qualified seniors. Assistant Professor MONROE. T Th 3, or other hours to be arranged. *Goldwin Smith* 162.

Reading of selected Old English works including Beowulf or some of the Cynwulfian poetry; studies in textual criticism and in style and metre; supplementary reading.

[55. **Middle English Literature.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Professor NORTHUP. Not given in 1927-28.]

56. **History of the English Language.** Second term. Credit two hours. T Th 12. Assistant Professor MONROE. *Goldwin Smith* 162.

The development of the English language, with consideration of language in general, including elementary phonetics. Recitations, lectures, collateral reading. The course does not require previous knowledge of Old and Middle English.

59. **Dramatic Structure.** Throughout the year. Credit three hours a term. Open to seniors and graduate students. Professor SAMPSON. T Th S 11. *Goldwin Smith* 156.

A study of the principles of dramatic construction based upon Greek, Elizabethan, and classical French drama (first term), and modern drama (second term).

65. **Short Story Writing.** First term only. Credit three hours. Open to upperclassmen after consultation with the instructor. Assistant Professor SMITH. T Th S 10. *Goldwin Smith* 160.

68. **English Usage and Style.** Throughout the year. Credit three hours a term. Open, after consultation with the instructor, to students who have com-

pleted English 20 or 22 with good marks. Professor STRUNK. T Th S 9. *Goldwin Smith* 160.

The first term is devoted chiefly to composition. The second term includes, along with composition, the study of the theory of good English, the study of words, idioms, and pronunciation and related topics.

69. **Teachers' Course.** Second term. Credit two hours. Open to seniors and graduates. Professor NORTHUP. T Th 12. *Goldwin Smith* 227.

Lectures, readings, and conferences on the teaching of English in the secondary schools.

70. **Wordsworth and his Contemporaries.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Assistant Professor BROUGHTON. M W F 9. *Goldwin Smith* 156.

First term: a detailed study of the works of Wordsworth and their influence on contemporary English thought and literature. Second term: the contemporaries of Wordsworth.

GRADUATE SEMINARIES

100. **Early English Metrical Romances.** Throughout the year. Dr. FRENCH. Room and hour to be arranged.

105. **The Essay.** Second term. Assistant Professor FISKE. Hour to be arranged. *Goldwin Smith* 338.

The personal essay as a type.

110. **Seventeenth Century Literature.** Throughout the year. Assistant Professor HEBEL. Room and hour to be arranged.

A study, with reports, of the problems of research in seventeenth century literature, designed to introduce the student to various modes of literary investigation.

115. **Eighteenth Century Prose.** Throughout the year. Assistant Professor BROUGHTON. Room and hour to be arranged.

Swift, Burke, and others.

125. **Old English.** Throughout the year. Assistant Professor MONROE. Room and hour to be arranged.

130. **English Literature, 1500-1640.** Throughout the year. Professor ADAMS. Hour to be arranged. *Goldwin Smith* 338.

131. **Methods and Materials in Elizabethan Research.** Throughout the year. Professor ADAMS. Hour to be arranged. *English Seminary Room.*

135. **Nineteenth Century Fiction.** Throughout the year. Professor NORTHUP. Th 4-6. *Goldwin Smith* 338.

Studies in the development of the novel from Scott to Meredith.

140. **American Literature.** Throughout the year. Professor PRESCOTT. Room and hour to be arranged.

145. **Shakespeare.** Throughout the year. Professor STRUNK. Room and hour to be arranged.

Textual and critical study of selected plays.

150. **Elizabethan Drama.** Throughout the year. Professor SAMPSON. Hour to be arranged. *Goldwin Smith* 159.

Webster, Middleton, Beaumont and Fletcher.

151. **Structure of the Lyric.** Throughout the year. Professor SAMPSON. M 12. *Goldwin Smith* 159.

A study of the short lyric in respect of the arrangement of its substance.

GEOLOGY

Students who intend to major in Geology, should if possible consult the Department not later than the beginning of the sophomore year.

*100. **Introductory Geology.** Repeated in the second term. Credit three hours. Professor RIES, Miss ST. JOHN, Mr. BURFOOT, and Mr. STOW. Lectures, first term, T Th 11; second term T Th 9. *Sibley Dome.* Laboratory, M T W Th F afternoons or S morning. *McGraw.*

Students must register for laboratory assignment at *Geology Laboratory, McGraw*, before the beginning of the course. The fundamental principles of this

branch of science. The inorganic aspects of the subject are emphasized more than the organic.

***400. Introductory Historic Geology.** Second term. Credit three hours. Prerequisite, Geology 100 or its equivalent; a course in vertebrate zoology is also desirable. This course would normally follow Course 100, but students who have had two terms of course 200, and Zoology 1, may also take it.

Professor HARRIS. Lectures, T Th 10. Laboratory to be arranged. *McGraw*. An elementary review of the geologic history of the earth and its inhabitants, with special emphasis on American Geology. Field trips in laboratory periods.

Courses 101, 102, 200, 201, 311, and 500 (first term) may also be taken following 100.

DYNAMIC AND STRUCTURAL GEOLOGY

***101. Major Problems in Geology.** Second term. Credit three hours. Prerequisite, Geology 100 or 501. Assistant Professor NEVIN. Lectures, T Th 11, F 2. *McGraw*.

A study of some of the interesting problems of Geology.

102. Structural Geology. First term. Credit three hours. Prerequisite, Geology 100 or the equivalent. Assistant Professor NEVIN. Lectures, T Th 11. Laboratory, T 2. *McGraw*.

A study of geologic structures and their causes with illustrations. Opportunity for field trips will be given, and they are strongly recommended. Those taking course 502 are advised to take this course first if possible.

103. Sedimentation. First term. Credit three hours. Prerequisite, Geology 100. Assistant Professor NEVIN. Lectures, T Th 9. Laboratory, Th 2. *McGraw*.

Part of the laboratory periods will be spent in the field. This course is devoted to a study of the principles involved in the formation of sediments.

104. Geologic Model Making. Second term. Credit variable. Prerequisite, Geology 100. Assistant Professor NEVIN. Day and hour to be arranged. *McGraw*.

Intended chiefly for students who are majoring in Geology.

105. Metamorphic Geology. First term. Credit two hours. For advanced students. Assistant Professor NEVIN. M W 9. *McGraw*.

The processes and criteria of rock metamorphism.

106. Special Work in Structural Geology. Throughout the year. Credit variable. Prerequisites variable. Assistant Professor NEVIN. Hours to be arranged. *McGraw*.

For advanced students and graduates. Original investigation adapted to the needs of the student.

107. Geologic Mapping. Second term. Credit two hours. Prerequisites, Geology 100, 102, 400. Assistant Professor NEVIN. F 10, and second hour to be arranged.

A discussion of the fundamental methods used in geologic mapping, together with practical work in the field. For students majoring in Geology.

PHYSICAL GEOGRAPHY

***200. Elementary Physical Geography.** Throughout the year. Credit three hours a term; if taken after Geology 201, credit two hours a term. Professor VON ENGELN and Mr. FRIDLEY. Lectures, M W 9. *McGraw, Geology Lecture Room*. Laboratory, W or Th 2-4:30. Students must register for laboratory assignments at the *Physical Geography Laboratory* on registration day.

High school courses are not the equivalent of this course and will not be so considered as a prerequisite for advanced courses. All students are required to go on one all-day excursion to Taughannock Gorge and Falls.

***201. Physiography of the Lands and Oceanography.** First term. Credit three hours. Open only to freshman and sophomore students who have had Geology 100. Professor VON ENGELN and Mr. FRIDLEY. Lectures, M W F 11. *McGraw, Geology Lecture Room*.

The systematic and cyclic development of land forms under humid, arid, and glacial conditions, and the interpretation of such forms; oceanic phenomena and

processes. Intended for students who desire a scientific appreciation of the inorganic elements of the landscape.

203. Geography of North America. Second term. Credit two hours. Students should consult instructor before registering. Professor VON ENGELN. Lectures, T Th 10. *McGraw, Geology Lecture Room.*

The physiographic features of North America; discussion of their influence upon the settlement and development of the various sections.

205. Glaciers and Glaciation. Second term. Credit three hours. Prerequisite Geology 200 or, with permission, Geology 100. Professor VON ENGELN and Mr. FRIDLEY. Lectures, T Th 11. *McGraw.* Laboratory, T 2-4:30. *McGraw.*

Living glaciers and the phenomena of the glacial period. Field excursions during the laboratory period in the spring; longer excursions on Saturday. Mapping and interpretation of glacial deposits.

206. Commercial Geography. First term. Credit two hours. Prerequisite, Geology 200 or Economics 1. Professor VON ENGELN. Lectures, T Th 11. *McGraw, Geology Lecture Room.* Lectures, reading, and term report.

The geographic factors affecting production and distribution of commodities. Discussion of the geographic origins and nature of commercial exchange of goods, routes of commerce, localization of industry, modern city sites, utilization of tropical lands, etc.

208. Advanced Physiography, Experimental and Research Work. Throughout the year. Credit variable. Registration by permission. Professor VON ENGELN. Day and hour to be arranged. *McGraw.*

Original investigation by each student; reading, conferences, excursions, and presentation of reports of progress. In general, graduate students registering for a minor in physical geography will be expected to take up some problem in this course.

209. Seminary. First term. Credit two hours. For upperclassmen and graduate students with requisite preparation. Registration by permission. Professor VON ENGELN. Day and hour to be arranged. *McGraw, Physical Geography Laboratory.*

Preparation and reading of reports upon special topics; abstracts and discussions of current geographic literature.

Meteorology and Climatology. (See Announcement of the College of Agriculture.)

MINERALOGY AND PETROGRAPHY

***311. Elementary Mineralogy.** Repeated in second term. Credit three hours; if taken after Geology 312, two hours. Prerequisite, Chemistry 101. Professor GILL and Dr. TRAINER. Lectures, M W 8. Laboratory, to be arranged. *Geology Lecture Room, McGraw.*

For beginners who desire a general knowledge of the commonest minerals, their uses, the properties by which they are recognized, and their significance as constituents of the earth's crust, or as sources of useful substances. The course consists of two parts, crystallography and mineralogy proper, in each of which a passing grade must be attained in order to receive credit for the course.

312. Crystallography. First term. Credit three hours; if taken after Geology 311, two hours. Prerequisite, Chemistry 205 or 210, and Physics 3. Professor GILL. Lectures, T Th 8. Laboratory to be arranged. *Geology Lecture Room, McGraw.*

313. Mineralogy. Second term. Credit three hours; if taken after Geology 311, credit two hours. Prerequisite, Geology 312. Professor GILL. Lectures, TTh 8. Laboratory to be arranged. *Mineralogy Laboratory, McGraw.*

For students wishing to become acquainted with the commoner minerals and with the scientific and practical problems which they present.

314. Blowpipe Determination of Minerals. First term. Credit one hour. Prerequisite, Geology 311 or 313, and Chemistry 205 or 210. Professor GILL and Dr. TRAINER. Saturday morning. *Blowpipe Laboratory, McGraw.*

315. General Lithology. Second term. Credit one hour. Prerequisite,

Geology 100 and 311. Professor GILL. Lectures, laboratory, and recitations, S 8-10. *Mineralogy Laboratory, McGraw.*

An elementary course designed to teach recognition of the various kinds of rocks, their mineral composition, and mode of origin.

316. Crystal Measurement and Drawing. Second term. Credit two hours. Prerequisite, Geology 312, and Trigonometry. Professor GILL. Day and hour to be arranged. *Mineralogy Laboratory, McGraw.*

Laboratory measurement of crystals, with computation and drawing. Course 316 should be taken after course 312 by students who intend to continue in course 317, or in course 320.

317. Optical Determination of Minerals. First term. Credit three hours. Prerequisite, Geology 313. Professor GILL and Dr. TRAINER. Lectures, M W. Laboratory, to be arranged. *Petrography Laboratory, McGraw.*

318. Petrography. Second term. Credit three hours. Prerequisite, Geology 317. Professor GILL and Dr. TRAINER. Lectures, M W. Laboratory, to be arranged. *Petrography Laboratory, McGraw.*

319. Sedimentary Petrography. Second term. Credit three hours. Prerequisite, Geology 317. Dr. TRAINER. Hours to be arranged. *McGraw.*

The methods of investigating the mineral composition, texture, and other physical characteristics of sedimentary rocks; some of the applications of these methods to geological problems.

320. Advanced or Special Work in Mineralogy, Crystallography, or Petrography. Throughout the year. Credit variable. Prerequisite, variable. Professor GILL and Dr. TRAINER. Day and hour to be arranged. *McGraw.*

Adapted to the needs of the individual student.

321. Seminary in Mineralogy and Crystallography. Throughout the year. Credit one hour a term. Prerequisite, Geology 312, 313, and 317. Professor GILL. M 4:45. *Mineralogy Laboratory, McGraw.*

PALEONTOLOGY AND STRATIGRAPHIC GEOLOGY

***400. Historic Geology.** Second term. Credit three hours. Prerequisite, Geology 100 or the equivalent; a course in vertebrate zoology is also desirable. Professor HARRIS. Lectures, T Th 10. Laboratory, to be arranged. *McGraw.*

An elementary review of the geologic history of the earth and its inhabitants, with special emphasis on American geology; the second half of the course in elementary geology. Field trips in laboratory periods.

401. General Stratigraphic Geology. Throughout the year. Credit two hours a term. Prerequisite, Geology 100, 400, 403, and reading knowledge of French and German. Professor HARRIS. Day and hour to be arranged. *McGraw 28.*

403. Invertebrate Paleontology. Throughout the year. Credit two hours a term. Prerequisite, Invertebrate Zoology or Biology. Pelecypoda and Gastropoda. Professor HARRIS. Day and hour to be arranged. *McGraw 28.*

404. Paleontologic Problems. Throughout the year. Credit variable. Prerequisite, Geology 400 and 403. Professor HARRIS. Day and hour to be arranged. *McGraw 28.*

405. Invertebrate Paleontology. Throughout the year. Credit two hours a term. Prerequisite, Invertebrate Zoology or Biology. Brachypoda and Cephalopoda. Professor HARRIS. Day and hour to be arranged. *McGraw 28.*

406. Invertebrate Paleontology. Throughout the year. Credit two hours a term. Prerequisite, Invertebrate Zoology or Biology. Microscopic organisms. Professor HARRIS. Day and hour to be arranged. *McGraw 28.*

ECONOMIC GEOLOGY

500. General Economic Geology. Throughout the year. Credit three hours a term. Prerequisite, first term, Geology 100; second term, 100 and 311. Professor RIES and Mr. LANGFORD. Lectures, M W 10. Laboratory, F 2. *McGraw.*

The origin, nature, distribution, uses and economic value of mineral products. First term, non-metallics, including coal, oil, gas, fertilizers, etc.; second term, the ore deposits of the different metals.

***501. Engineering Geology.** Repeated in second term. Credit four hours. For engineering students. Professor RIES and Mr. LANGFORD. Lectures, M W 11. Two laboratory periods, M W or T Th 2. *McGraw*. Not the equivalent of Geology 100.

A discussion of the practical application of geologic principles to engineering work, and of the occurrence of such economic materials as are of importance to engineering students.

502. Petroleum Geology. Second term. Credit three hours. Prerequisite, Geology 100. Assistant Professor NEVIN. Lectures, T Th 9. Laboratory or field work, Th 2. *McGraw*.

A course on the geology, geologic field methods, distribution, and methods of obtaining petroleum.

510. Clay Investigation. Second term. Credit three hours. Prerequisite, Geology 100 or 501, and Chemistry 101, and permission of the instructor. Professor RIES and Miss ST. JOHN. One lecture and two laboratory periods to be arranged. *McGraw*. Registration by permission.

511. Advanced or Special Work in Economic Geology. Throughout the year. Credit three hours. Prerequisite, dependent on the nature of the work. Professor RIES. Day and hour to be arranged. *McGraw*.

512. Seminary in Economic Geology. Throughout the year. Credit two hours a term. Prerequisite, Geology 100 and 500. Professor RIES. Day and hour to be arranged. *McGraw*.

Open only to graduates.

GERMAN

***1. Course for Beginners: Oral Training, Grammar, Composition, Translation.** Repeated in second term. Credit six hours.

First term:

Sec. 1, daily 8. *Goldwin Smith* 183. Dr. KUBLER.

Sec. 2, daily 10. *Goldwin Smith* 183. Professor POPE.

Second term:

Sec. 1, daily 8. *Goldwin Smith* 183. Dr. KUBLER.

Sec. 2, daily 9. *Goldwin Smith* 183. Assistant Professor ANDREWS.

This course is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected for three hours' credit by students who have entrance credit for only one unit of German (first year German).

***1a. Course for Beginners: Oral Training, Grammar, Composition, Translation.** Throughout the year. Credit six hours on completion of the course.

First term:

Sec. 1, M W F 9. *Goldwin Smith* 177. Dr. KUBLER.

Sec. 2, M W F 11. *Goldwin Smith* 183. Professor BOESCHE.

Sec. 3, M W F 11. *Goldwin Smith* 177. Dr. KUBLER.

Sec. 4, M W F 12. *Goldwin Smith* 190. Assistant Professor ANDREWS.

Second term:

Sec. 1, M W F 9. *Goldwin Smith* 177. Dr. KUBLER.

Sec. 2, M W F 11. *Goldwin Smith* 183. Dr. KUBLER.

Sec. 3, M W F 12. *Goldwin Smith* 190. Assistant Professor ANDREWS.

This course is continuous throughout the year, and no credit is allowed for the first term alone. It is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected in the second term by students who have had first year German (one unit).

***3. Oral Training, Grammar, Composition, Translation.** Repeated in second term. Credit five hours. Prerequisite, German I, or entrance credit for two units of German (first and second year German).

First term:

M T W Th F 10. *Goldwin Smith* 190. Professor FAUST.

Second term:

M T W Th F 10. *Goldwin Smith* 190. Professor FAUST.

This course is equivalent to third year German of the entrance requirements.

*3a. **Oral Training, Grammar, Composition, Translation.** Throughout the year. Credit three hours a term. Prerequisite, German 1, or entrance credit for two units of German (first and second year German). Dr. KUBLER. T Th S 12. *Goldwin Smith* 183.

This course is equivalent to third year German of the entrance requirements.

*4. **Elementary German Composition and Conversation.** Throughout the year. Credit three hours a term. Open to those who are taking or have taken German 3. Professor POPE. M W F 12. *Goldwin Smith* 183.

Exercises conducted in German. Course 4 may be combined with courses 3 or 5.

*5. **Intermediate German Course.** Throughout the year. Credit three hours a term. Prerequisite, German 3, or its equivalent. First term, Professor FAUST; second term, Professor POPE. M W F 11. *Goldwin Smith* 190.

Reading of modern German texts; oral exercises in German on the text; German grammar treated topically.

*8. **Scientific German.** Second term. Credit three hours. Prerequisite, German 1-3, or three years of German in High School. Assistant Professor ANDREWS. M W F 10. *Goldwin Smith* 183.

10. **Advanced German Composition and Conversation.** First term only in 1927-28. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. M W F 10. *Goldwin Smith* 177.

Exercises conducted in German. Theme-writing. This course is essential for the pursuit of advanced work in the department, and must be completed by students who desire to be recommended as teachers of German.

11. **Schiller's Dramas.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Assistant Professor ANDREWS. M W F 2. *Goldwin Smith* 177.

12. **Schiller's Lyrics.** Second term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor POPE. T Th S 10. *Goldwin Smith* 183.

13. **Goethe's Life and Works.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. T Th S 9. *Goldwin Smith* 190.

14. **Goethe's Faust**, part I and selected portions of part II. Second term. Credit three hours. Not open to freshmen. Prerequisite, German 1-5, or the equivalent. Professor FAUST. T Th S 9. *Goldwin Smith* 190.

15. **Survey of German Literature.** Throughout the year. Credit three hours a term. Prerequisite, reading knowledge of German. Professor FAUST. M W F 9. *Goldwin Smith* 190.

Lectures in English, outlining the history of German literature from the Old High German period to the present time. Collateral reading in German.

[16. **Contemporary German Literature.** Throughout the year. Credit three hours a term. Prerequisite, German 1-5, or the equivalent. Professor FAUST. Not given in 1927-28.]

[17. **Nineteenth Century Drama.** Kleist, Grillparzer, Hebbel, Hauptmann. Throughout the year. Credit three hours a term. Prerequisite courses 1-5, or the equivalent. Professor POPE. Not given in 1927-28.]

18. **Lessing's Life and Works.** First term. Credit three hours. Prerequisite courses 1-5 or the equivalent. Professor POPE. T Th S 11. *Goldwin Smith* 190.

37. **Middle High German.** Throughout the year. Credit three hours a term. Prerequisite, German 1-5, 10, and six hours of literature. First term, Assistant Professor ANDREWS. M W F 3. *Goldwin Smith* 178. Second term, Professor POPE. M W F 3. *Goldwin Smith* 177.

[39. **Teachers' Course in German Composition.** Throughout the year. Credit two hours a term. Admission by permission only. Professor BOESCHE. Not given in 1927-28.]

[40. **Teachers' Course in Methods.** Second term. Credit two hours. Prerequisite, German 1-5, 10, and twelve hours of advanced work in German literature or philology. Professor FAUST. Not given in 1927-28.]

42. **Gothic.** First term. Credit three hours. Professor BOESCHE. M W F 8. *Goldwin Smith* 188.

[43. **Old High German.** Second term. Credit three hours. Prerequisite German 37. Professor BOESCHE. Not given in 1927-28.]

[48. **Principles of Germanic Philology.** Second term. Credit two hours. Prerequisite German 42. Assistant Professor ANDREWS. Not given in 1927-28.]

49. **Seminary in German Literature.** First term. Credit two hours. For graduates only. Professor FAUST. Th 2-4. *Goldwin Smith* 181.

Problems in Contemporary German Literature.

[50. **Seminary in German Literature.** Second term. Credit two hours. Professor POPE. Not given in 1927-28.]

[52. **Seminary in German Philology.** Second term. Credit two hours. Professor BOESCHE. Not given in 1927-28.]

GOVERNMENT

*1. **American National Government.** First term. Credit three hours. Open to sophomores. Professor CUSHMAN. Lectures, T Th 9. Quiz hours to be arranged. *Goldwin Smith* A.

Historical development, organization, powers, and practical working of the American national government.

*2. **Comparative Government.** Second term. Credit three hours. Open to sophomores. Assistant Professor MACKAY. Lectures, T Th 9. Quiz hours to be arranged. *Goldwin Smith* A.

Government and politics of England and Continental Europe, particularly France and Switzerland; tendencies in the new Europe; federal government.

*5. **American State Government.** Second term. Credit three hours. Open to sophomores. Acting Assistant Professor JOHNSTON.

Lectures, M W 8. Quiz hours to be arranged. *Goldwin Smith* 124.

A comparative study of American state governments. State constitutions, their origin, nature, and methods of amendment; the organization and functions of the three departments; current political and administrative problems.

[*6. **Political Parties and Popular Government.** Second term. Credit three hours. Open to sophomores. Professor CUSHMAN. Not given in 1927-28.]

*8. **History of Political Thought.** First term. Credit three hours. Open to sophomores. Acting Assistant Professor JOHNSTON.

T Th S 10. *Goldwin Smith* 177.

An introductory course in political theory.

*9. **An Introduction to International Relations.** First term. Credit three hours. Open to sophomores. Assistant Professor MACKAY. M W F 8. *Goldwin Smith* 124.

An elementary study of the principal geographical, economic, political, and other factors affecting current international politics.

Not open to students who have had Government 15.

[10. **Political Philosophy and Science.** First term. Credit three hours. Open to upperclassmen. Assistant Professor CATLIN. F 4 and other hours to be arranged. *Goldwin Smith* 227. Not given in 1927-28.]

[11. **Political Institutions.** Second term. Credit three hours. Prerequisite, Government 2 or equivalent studies. Assistant Professor CATLIN. M W F 10. *Goldwin Smith* 120. Not given in 1927-28.]

14. **Introduction to International Law.** First term. Credit three hours. Open to upperclassmen. Assistant Professor MACKAY. M W F 9. *Goldwin Smith* 234.

Introduction to the fundamental principles of International Law. Case method to be followed.

15. **Problems of International Relations.** Second term. Credit three hours. Open to upperclassmen. Assistant Professor MACKAY. M W F 9. *Goldwin Smith* 120.

Problems of arbitration; imperialism and international organization; the settlement of international disputes; the League of Nations; the Permanent Court of International Justice.

18. **Advanced European Government.** First term. Credit three hours. Open to upperclassmen. Acting Assistant Professor JOHNSTON. M W F 10. *Goldwin Smith* 281.

An intensive course in the government of selected European countries. Special emphasis will be given to England and the British Empire.

20. Constitutional Law: The American Federal System. First term. Credit three hours. Open to upperclassmen. Professor CUSHMAN. T Th S 11. *Goldwin Smith* 234.

Judicial interpretation of the constitution; the nature of judicial review; separation of governmental powers; relations between state and national government; construction of national powers.

Government 20 and 21 are not designed primarily for pre-law students, but for those having a major interest in government, history, and economics. Attention is called to the fact that the Law School requires for graduation the regular Law School course in constitutional law.

21. Constitutional Law: Fundamental Rights and Immunities. Second term. Credit three hours. Open to upperclassmen. Acting Assistant Professor JOHNSTON. T Th S 11. *Goldwin Smith* 234.

Privileges and immunities of citizenship; protection of civil and political rights; the obligation of contracts; due process of law and the equal protection of the law. Not designed primarily for pre-law students, but for those having a major interest in government, history, and economics. The Law School requires its students to complete the Law course in Constitutional Law before graduation.

22. Seminary in Constitutional Problems. First term. Credit two hours a term. Open to graduate students and qualified seniors. Professor CUSHMAN. Day and hour to be arranged.

23. Seminary in Politics. Throughout the year. Credit two hours a term. Open to graduate students and qualified seniors. Assistant Professor CATLIN. Day and hour to be arranged. Not given in 1927-28.]

24. Seminary in International Law and Relations. Throughout the year. Credit two hours a term. Open to qualified seniors and graduate students. Assistant Professor MACKAY. Day and hour to be arranged.

24a. Seminary in the British Commonwealth. Throughout the year. Credit two hours a term. Open to graduates and qualified seniors. Acting Assistant Professor JOHNSTON. Day and hour to be arranged.

25. Social and Political Ethics, and the Philosophical Theory of the State. (See Philosophy 7a.)

26. Problems of Labor. (See Economics 44.)

27. Public Revenues. (See Economics 82.)

The attention of students whose upperclass group is History and Government is called to the following courses given in the Law School. They are open to Arts students only by permission of the Dean, and of the professor in charge of each course. For details see the Announcement of the Law School.

Administrative Law and Public Officers.

Constitutional Law.

International Law.

Jurisprudence.

Labor Law.

Municipal Corporations.

Law of Public Service and Carriers.

Restraints on Business and Industry.

Taxation.

HISTORY

***1. Outlines of Ancient History.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours only. Professor LAISTNER. M W 9 and an hour to be arranged. *Goldwin Smith* A.

Textbook, lectures, and collateral reading. First term. The Near Eastern countries and Greece to 405 B. C. Second term. Greek and Roman History, 405 B. C. to 330 A. D.

3. Greek History, 500 to 323 B. C. Second term. Credit three hours. Prerequisite, History 1 or the equivalent. Professor LAISTNER. M W F 11. *Goldwin Smith* 236.

[4. **The Roman Empire, 30 B. C. to 180 A. D.** Second term. Credit three hours. Prerequisite, History 1 or 3. Professor LAISTNER. M W F 11. *Goldwin Smith* 236. Not given in 1927-28.]

[5. **The Roman Republic, 133 to 30 B. C.** First term. Credit three hours. Prerequisites, History 1, 4 or a satisfactory equivalent. Professor LAISTNER. M W F 11. *Goldwin Smith* 236. Not given in 1927-28.]

Open to sophomores, juniors, and seniors. A detailed study of the political history of the period, with some reference to social and economic conditions.

[6. **Greek and Roman Writers of History from Herodotus to Procopius.** Throughout the year. Credit four hours on completion of the course. Prerequisites, History 1, 3, 4, 5, or a satisfactory equivalent. Professor LAISTNER. T Th 10. *Goldwin Smith* 236. Not given in 1927-28.]

Open to qualified upperclassmen and graduates with permission of the instructor. Lectures and readings (in translation) of the historical writers of Greece and Rome.

7. **The History of Education.** (Greek, Roman, and Early Medieval). First term. Credit two hours. For upperclassmen and graduates only. Professor LAISTNER. T Th 10. *Goldwin Smith* 234.

14. **Seminary in Ancient History.** Roman Historical Inscriptions. Throughout the year. Credit two hours a term. Professor LAISTNER. Open to graduates with a reading knowledge of Latin.

18. **Oriental History.** Throughout the year. Credit two hours a term. Professor SCHMIDT. A general survey of the History of Asia. Open only to juniors, seniors, and graduates. T Th 10. *Goldwin Smith* 242.

[19. **Oriental History.** Throughout the year. Credit two hours. Professor SCHMIDT. A general survey of the history of Africa. Open only to juniors, seniors, and graduates. Not given in 1927-28.]

21. **The Middle Ages.** First term. Credit three hours. Professor SMITH. M W F 10. *Goldwin Smith* C.

The history of Christendom from the time of Constantine to the dawn of the Renaissance (300-1300) with special attention to the life of society and to the progress of civilization. Lectures, quizzes, examinations.

22. **The Age of the Renaissance and Reformation.** Second term. Credit three hours. Professor SMITH. M W F 10. *Goldwin Smith* A.

The political, social, and religious history of Christendom during this age of transition, with special attention to the beginnings of modern life and thought.

24. **History of Culture from the Renaissance to the Enlightenment.** First term. Credit two hours. Open to juniors and seniors. Professor SMITH. T Th 3. *Goldwin Smith* 234.

The intellectual history of Western Europe during the sixteenth, seventeenth, and eighteenth centuries, including the advance of science and learning, the religious changes following the Reformation, the struggle for freedom of conscience, the decline of superstition, and the growth of rationalism.

26. **Latin Paleography and Diplomatics.** First term. Credit two hours. Prerequisite, a reading knowledge of Latin. Professor SMITH. S 10. *European History Seminary Room, Library.*

An introduction to the sciences of reading, criticising, and interpreting medieval Latin manuscripts.

27. **Historical Method.** Second term. Credit two hours. Prerequisite, a reading knowledge of either French or German. Professor SMITH. S 10. *European History Seminary Room, Library.*

A study of the principles of historical investigation, criticism, and writing, a survey of the great modern historians, and an examination of recent works on the theory and practice of historiography.

[28. **Church History.** Throughout the year. Credit two hours. Open to graduates and qualified seniors. Prerequisite, a reading knowledge of Latin. Professor SMITH. Not given in 1927-28.]

29. **History of Education (Late Medieval and Modern).** Second term. Credit two hours. Professor SMITH. T Th 10. *Goldwin Smith* 234.

This is a continuation of History 7, but either term may be taken separately.

It is a survey of the growth of schools and universities, of changing educational practice, and of the progress of pedagogical theory from the tenth to the nineteenth century.

42. **History of Modern Europe.** Throughout the year. Credit three hours a term. Not open to freshmen. Professor BECKER. M W F 3. *Goldwin Smith C.*

A survey of European history from the beginning of the 17th century to 1914. Political, economic, and intellectual movements emphasized in proportion to their international or European importance.

43. **French Revolution.** First term. Credit two hours. Prerequisite, first term of History 42, or the equivalent. Professor BECKER. T Th 3. *Goldwin Smith 242.*

A study of the Revolution from 1789 to 1795, with a preliminary survey of the organization of French society before 1789.

44. **Napoleonic Era.** Second term. Credit two hours. Prerequisite, first term of History 42, or the equivalent. Professor BECKER. T Th 3. *Goldwin Smith 242.*

A study of the rise and fall of the Napoleonic Empire, 1795-1815.

45. **The Federation of Europe.** Second term. Credit two hours. Prerequisite, History 42, or the equivalent. Professor BECKER. Not given in 1927-28.]

48. **Seminary in French Revolution.** Professor BECKER.

*61. **English History.** Throughout the year. Credit six hours on completion of the course; upperclassmen four hours. First term, Professor NOTESTEIN, second term, Dr. MARCHAM. T Th 10, and an hour to be arranged. *Goldwin Smith B.*

No credit is given for the first term alone.

63. **Political and Social History of England, 1603-1642.** First term. Credit three hours. Prerequisite, History 61, or 67 and 68. Professor NOTESTEIN. M W 7:30-9 p. m. *Goldwin Smith 236.*

Open to juniors and seniors by special permission.

64. **Seminary in English History.** First term. Credit two hours. Professor NOTESTEIN. Th 7-9 p. m. *Modern European History Seminary Room, Library.*

65. **Tudor England.** First term. Credit two hours. Dr. MARCHAM. T Th 3. Room to be arranged.

Open to juniors and seniors. Political, social, and intellectual history. A lecture course with assigned readings in the writings of the period.

67. **England, 1660 to the end of the 18th Century.** First term. Credit three hours. Dr. MARCHAM. T Th S 9, *Goldwin Smith C.*

Open to sophomores, juniors, and seniors. A lecture course. Readings in the letters, plays, diaries, and novels of the period.

68. **England from the Early 19th Century to the Present Day.** Second term. Credit three hours. Dr. MARCHAM. T Th S 9. *Goldwin Smith C.*

Open to sophomores, juniors, and seniors. A lecture course. Readings in the letters, plays, diaries, and novels of the period.

81. **American Social History from 1861 to the Present.** Second term. Credit two hours. Professor NEVINS. Prerequisite, History 82, 83, or the equivalent. T Th 9. *Goldwin Smith 177.*

The course deals with the social and to some extent the cultural history of the United States in the period following the Civil War.

*82. **American History, 1787-1850.** First term. Credit three hours. Open to sophomores, juniors, seniors, and to freshmen in special cases with the approval of their advisers. Professor NEVINS. M W F 9. *Goldwin Smith C.* Apply at *Goldwin Smith 234* on registration day for seat assignment.

Formation of new national government; European complications; domestic problems; rise of sectional parties. Textbook, lectures, and readings.

*83. **American History, 1850-1914.** Second term. Credit three hours. Professor NEVINS. Prerequisite, History 82. M W F 9. *Goldwin Smith C.*

Open to sophomores, juniors, seniors, and freshmen in special cases with the approval of their advisers. Secession and civil war, reconstruction, recent political and constitutional history. Textbook, lectures, and readings.

84. **Economic History of the United States to 1837.** First term. Credit three

hours. Prerequisite, History 1, 61, 82, or 83, or Economics 1 or 2. Professor HULL. M W F 9. *Goldwin Smith* 134.

Colonization and settlement as business enterprises; the agriculture of the coast; competition between slave, indentured, and free labor; commerce, especially during the revolutionary wars; public lands and the westward movement. A term paper is required.

85. **Economic History of the United States since 1837.** Second term. Credit three hours. Prerequisite, History 84, or an accepted equivalent. Professor HULL. M W F 9. *Goldwin Smith* 234.

Transportation, manufactures, and the differentiation of sections; agriculture for export; the amalgamation of railways and the combination of industries; government control. A term paper is required.

[86. **Constitutional History of the United States.** First term. Credit two hours. Prerequisite, History 82, 83, or the equivalent. Professor BRETZ. Not given in 1927-28. Will be given 1928-29.]

88. **Foreign Relations of the United States.** Second term. Credit two hours. Prerequisite courses 82 and 83. Professor HULL. T Th 9. *Goldwin Smith* 234.

[89. **American History, 1750-1848: The Settlement of the Middle West.** Second term. Credit two hours. Prerequisite, History 82, 83, or the equivalent. Upperclassmen only. Professor BRETZ. Not given in 1927-28. Will be given 1928-29.]

91. **Constitutional History of the Colonies and States to 1787.** First term. Credit two hours. Prerequisite courses 82 and 83. Professor HULL. T Th 9. *Goldwin Smith* 234.

[97. **American History.** Investigation of topics in a selected field. Throughout the year. Credit two hours a term. Professor BRETZ. Not given in 1927-28. Will be given in 1928-29.]

98. **Seminary in American History.** Credit two hours a term. Professor HULL. Hours to be arranged. *Library, American History Room.*

For graduates. Open to qualified seniors by permission. First meeting, October 3, 4 p. m.

[101. **Teaching of History.** Second term. Credit two hours. Consult Professor BRETZ. Not given in 1927-28.]

MATHEMATICS

Examinations for the removal of conditions in courses 1 to 8 are held in September just before registration, and during examination week of each term. For further information regarding the time and place of these examinations students, should apply to Mr. BEISEL, White B4.

Students wishing to take any of the courses numbered above 15 are asked to meet in White 5 at 3:30 P. M. on the first day of instruction of the first term, to confer with the teachers concerning these courses, and to arrange schedules.

Of courses 1-8, not more than six (6) hours may be taken simultaneously without the special permission of the department.

*1. **Solid Geometry.** Repeated in second term. Credit three hours. First term, T Th S 10, M W F 8. Second term, M W F 10, T Th S 8. These sections at 8 will be restricted to a small number of students who are candidates for the A.B. degree.

*2. **Advanced Algebra.** Repeated in second term. Credit three hours. M W F 9, T Th S 9.

*2f. **Introduction to the Mathematics of Finance.** Repeated in second term. Credit three hours. T Th S 9.

*3. **Plane Trigonometry.** Repeated in second term. Credit three hours. First term, M W F 10, T Th S 8. Second term, T Th S 10, M W F 8. The sections at 8 will be restricted to a small number of students who are candidates for the A.B. degree.

4a, 4b. **Analytic Geometry and Calculus.** Primarily for students in the College of Arts and Sciences. Prerequisite, Mathematics 1, 2, 3, or the equivalent.

*4a. Daily except S, 8. Credit five hours. Repeated second term.
4b. Daily except S, 8. Credit five hours. Continuation of 4a. Repeated second term.

5a, 5b. **Analytic Geometry and Calculus.** Primarily for students in the College of Engineering. Prerequisite, Mathematics 1, 2, 3, or the equivalent.

*5a. Daily except S. Credit five hours. Repeated second term.

5b. Daily. Credit six hours. Continuation of course 5a. Repeated second term.

5a, 7. **Analytic Geometry and Calculus.** Primarily for candidates for the degree of B.Chem. Prerequisite, Mathematics 1, 2, 3, or the equivalent. Daily except S.

*5a. Credit five hours. Repeated in second term.

7. Credit five hours. Continuation of 5a. Second term only.

*8. **Analytic Geometry and Calculus.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 1, 2, 3, or the equivalent.

Primarily for students in the College of Architecture.

*15. **Elementary Course in Higher Mathematics.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 1, 2, 3, or the equivalent. Professor HURWITZ. T Th S 9. *White 6.*

Students who have had the equivalent of any part of Mathematics 4a, 4b may receive only partial credit for the second term.

Intended for students who do not plan to take many courses in mathematics, but who wish to become acquainted with the principal ideas of the subject. The object will be to make clear the fundamental aims, methods, and results of a number of subjects, rather than to develop the technique of any one. The course will deal with the theory of numbers, vector analysis, groups; synthetic geometry, including some topics in projective, non-euclidean, and higher dimensional geometry; analytic geometry, calculus, famous problems of mathematics. Lectures, assigned reading, and exercises.

[20. **Teachers' Course.** Throughout the year. Credit three hours a term. Prerequisite or parallel course, Mathematics 4b. Assistant Professor CRAIG. T Th S 10. *White 5.* Not to be given in 1927-28. To be given in 1928-29.]

A review of the methods of proof of important topics in algebra and geometry; an attempt to give perspective to elementary mathematics by showing the co-ordination between the parts.

21. **Theory of Numbers.** First term. Credit three hours. Prerequisites, Mathematics 4b or the equivalent. Professor RANUM. *White 9.*

An introduction to the elementary theory, with emphasis on the Abelian groups involved.

23. **Modern Higher Algebra.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Assistant Professor CRAIG. M W F 10. *White 5.*

First term, algebraic equations, transformations of equations, determinants, elimination, cubic and biquadratic equations, invariants and covariants. Second term, determinants, linear equations, matrices, linear transformations, invariants, bilinear forms, quadratic forms, elementary divisors. The work of the first term and that of the second are independent.

26. **Theory of Finite Groups.** Second term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Professor CARVER. M W F 10. *White 10.*

An elementary course dealing with groups of motions, permutations, and transformations; and treating such abstract group topics as simple and multiple isomorphism, Sylow's theorem, Abelian and prime-power groups.

41. **Elementary Differential Equations.** Repeated in second term. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. First term, Professor CARVER. T Th S 11. *White 10.* Second term, Professor HUTCHINSON. M W F 11. *White 25.*

42. **Advanced Calculus.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Mr. FRALEIGH. M W F 11. *White 21.*

A study of the processes of the calculus, their meanings and applications. It is

designed to furnish a necessary preparation for advanced work in analysis and applied mathematics.

45. Theory of Functions of a Complex Variable. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Professor HUTCHINSON. T Th S 9. *While 25.*

An elementary course including the most important fundamental ideas and methods, with applications to particular functions, such as the Elliptic, Gamma, and Bessel functions.

61. Projective Geometry. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Professor SNYDER. M W F 9. *While 24.* The elements of projective geometry treated synthetically.

62. Advanced Analytic Geometry. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Mr. SHAUB. T Th S 10. *While 28.*

Systems of coordinates, with application to cubic and quartic curves; linear and quadratic transformations; parametric representation of rational and elliptic curves; asymptotes and curve tracing; Plücker's numbers.

67. Differential Geometry of Curves and Surfaces. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Dr. KIMBALL. *While 2.*

The development of the general methods for the study of curves and surfaces in the neighborhood of a point by means of the calculus; the curvature and torsion of space curves; the mean and total curvature of surfaces; asymptotic lines, geodesics, and polar geodesic coordinates.

80. Differential Equations of Mathematical Physics. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 42 or the equivalent. Professor HURWITZ. T Th S 11. *While 6.*

The derivation of the differential equations, with appropriate boundary conditions, which arise in certain problems of mathematical physics; the mathematical properties of solutions, and the physical meaning of these properties.

82. Graphical and Mechanical Computation. First term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Mr. PORITSKY. *While 21.* Empirical equations; planimeters and integrating devices; nomograms; computing machines; mechanical drafting devices.

84. Principles of Mechanics. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 42 or the equivalent. Professor GILLESPIE. *While 1.*

An introduction to the calculus of variations; a statement of the classical hypotheses in mechanics; an introduction to continuous groups and their application to the equations of motion in the canonical form.

87. Wave Motion. Second term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Mr. PORITSKY. *While 21.*

Study of the differential equation of wave motion; propagation, interference, and diffraction of waves; resonance; applications to hydrodynamics, acoustics, and electricity.

89. Hydrodynamics and Elasticity. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Professor SHARPE. *While 28.* A course intended primarily for students of physics and engineering.

100. Problems and Research.

The following additional courses are offered at intervals of two to three years: Infinite Series; Functions of Real Variables; Integral Equations; Calculus of Variations; Algebraic Curves; Algebraic Surfaces; Line Geometry; Geometry of Hyperspace; Non-Euclidean Geometry; Vector Analysis; Probabilities; Potential Theory; Fourier Series and Integrals.

MUSIC

The courses offered by the Department of Music are designed to afford to all students having sufficient native ability the opportunity to study music as a part of the college course. The aim is to make musical training contribute to liberal culture.

Credit for Courses 1, 6, and 7 may be counted as part of the thirty hours which a student may elect outside of the College of Arts and Sciences, but may not be counted as part of the ninety hours required in the College. (See paragraph 1, p. 12.)

Application for admission to the Morning Choir (Course 6), the Advanced Choir (Course 7), and to Courses 1, 10, and 16, of new students and others not previously classified should be made at Morse Hall 102, daily, Wednesday to Friday, September 26-28, from 9 to 12.

1. Elementary. Throughout the year. Credit four hours on completion of the course, no credit for first term alone. Primarily for freshmen, but open to all students showing sufficient aptitude to pursue the subject with profit. Acting Assistant Professor MEAD. T 7:15, *Sage Chapel*. W 4:45, *Morse Hall*.

Ear training; elementary sight reading; elementary theory, including the construction of scales; musical dictation and intervals; the elements of musical design and phraseology. The chief purpose of this course is to train the musical faculties of the student in order to furnish a basis for discriminating musical listening. The course, or its equivalent, is fundamental to all other courses in music.

6. Sage Chapel Morning Choir. Throughout the year. Two hours credit on the completion of the course; no credit for first term alone. Prerequisite, ability to sing simple music. Professor ——— and Acting Assistant Professor MEAD. Sunday 10 to 12:30. *Sage Chapel*.

For admission to this course see general departmental note above.

7. Advanced Choir. Throughout the year. Credit four hours on completion of the course. Prerequisite, a singing voice and the ability to read at sight music of moderate difficulty. Professor ———. M 7:15-9, W 4:45, Sunday 2:30. *Sage Chapel*.

Preparation and presentation of choral classics, old and new. This course may not be repeated for credit; for admission, see general departmental note above.

10. Harmony. Throughout the year. Credit three hours a term. Prerequisite, Music 1 or the equivalent. Acting Assistant Professor MEAD. M W F 9. *Morse 105*.

The construction and interconnection of triads and their inversions; chords of the seventh and their inversions; chords of the ninth, chromatic harmony, suspensions and ornamental tones; harmonizing both bass and soprano melodies.

16. Counterpoint. Throughout the year. Credit two hours a term. Prerequisite, Music 10 or the equivalent. Acting Assistant Professor MEAD. T Th 9. *Morse 105*.

A course dealing with the principles of melodic combination.

17. The Art of Music. Throughout the year. Credit three hours a term. Open to upperclassmen. Professor ———. M W F 11. *Morse 105*.

The fundamental acoustic, psychological, theoretical, aesthetic, and historical factors which enter into a rational understanding and enjoyment of the art.

21. History of Music. Throughout the year. Credit two hours a term. Open to upperclassmen and graduates. Professor ———. T Th 10. *Morse 105*.

A complete survey of the evolution of the art of music, with particular reference to questions of style and to the place of music in the artistic and social life of nations. First term, the music of primitive and exotic nations, of antiquity, and of the Middle Ages. Second term, from the sixteenth century to the present day.

PHILOSOPHY

***1. Problems of Philosophy.** Second term. Credit three hours. Professor THILLY, Dr. PAINE, and Mr. FISCH. M W F 11. *Goldwin Smith 225*.

The fundamental problems of philosophy, together with a critical study of the most important types of philosophical theory.

***2. Logic.** First term. Credit three hours. Dr. PAINE. M W F 12. *Goldwin Smith 227*.

This course will cover practically the same ground as course 3, which is given in the second term.

***3. Logic.** Second term. Credit three hours. Assistant Professor SMART. M W F 10. *Goldwin Smith 221*. Dr. PAINE. T Th S 9. *Goldwin Smith 227*.

The general character of the thinking process, its laws of development, and the methods by which thought actually proceeds to solve problems presented to it, in both the deductive and inductive processes of reasoning.

*3a. **Logic.** Second term. Credit three hours. Open only to freshmen. Mr. FISCH. M W F 8. *Goldwin Smith 221.*

This course covers the same ground as course 3.

4. **The Fine Arts, Their Philosophy and History in Outline.** First term. Credit three hours. Professor HAMMOND. T Th S 10. *Goldwin Smith A.*

An elementary course on aesthetics. Lectures, assigned readings, and examinations.

4a. **The Renaissance.** Second term. Credit three hours. Professor HAMMOND. T Th S 10. *Goldwin Smith A.*

Lectures and assigned readings. A philosophical study of the civilization of the Renaissance, with special reference to the fine arts, the rise of humanism, and the beginnings of modern philosophical and political theories.

5. **History of Philosophy.** Throughout the year. Credit three hours a term. Professors CUNNINGHAM. T Th S 9. *Goldwin Smith 225.*

The history of philosophical speculation from its origin among the Greeks to the present time; the various philosophical systems in their relation to the science and general civilization of the ages to which they belong, and their application to social, political, and educational problems. Lectures, assigned readings, and reports. Open to juniors, seniors, and graduates.

[*6. **Moral Ideas and Practice.** Second term. Credit three hours. Professor THILLY. M W F 11. *Goldwin Smith 225.* Not given in 1927-28.]

The development of moral ideas, ideals, and philosophies from early times to the present, with special emphasis on the great civilizations of the Occident.

[7. **Ethics.** First term. Credit three hours. Open only to juniors, seniors, and graduates. Professor THILLY. M W F 10. *Goldwin Smith 225.* Not given in 1927-28.]

A study of the moral consciousness and of theories of right and wrong with a view to reaching a philosophy of life.

7a. **Social and Political Ethics.** Second term. Credit three hours. Open only to juniors, seniors, and graduates. Professor THILLY. M W F 10. *Goldwin Smith 225.*

A study of the philosophical principles underlying our social, legal, and political conceptions.

8. **Idealism: Platonic and Modern.** Throughout the year. Credit two hours a term. Open only to juniors, seniors, and graduates. Assistant Professor SMART. W F 9. *Goldwin Smith 225.*

An introduction to the philosophy of Plato and to some related tendencies and developments in modern thought—Berkeley, Kant, Fichte, Hegel, etc. Lectures and discussions.

[9. **Philosophical Ideas in Nineteenth Century Literature.** First term. Credit three hours. Professor ALBEE. M W F 12. *Goldwin Smith 225.* Not given in 1927-28.]

After considering the tendencies of eighteenth century thought, the course will deal with the interpretations of life offered by well known authors of the nineteenth century, English, continental, and American, and the relation of such interpretations to the recognized tendencies of contemporary philosophy. Primarily for juniors and seniors.

9a. **The Philosophy of William James.** First term. Credit two hours. Dr. PAINE. M W 11. *Goldwin Smith 220.*

A study of pragmatism as developed in the writings of William James. Lectures and discussions. Primarily for juniors and seniors.

10. **The Philosophy of Bergson.** Second term. Credit two hours. For juniors, seniors, and graduates. Professor CUNNINGHAM. M W 11. *Goldwin Smith 227.*

A somewhat detailed study of the main writings of Bergson, and a critical estimate of the basal points in his philosophy.

12. **The Theory of Evolution.** Throughout the year. Credit one hour a term. Not open to underclassmen. Dr. PAINE. S 11. *Goldwin Smith 227.*

History of the evolutionary theory followed by discussion of its philosophical bearings.

13. **Origin and Development of Religious Ideas.** First term. Credit two hours. Not open to underclassmen. Dr. PAINE. T Th 12. *Goldwin Smith* 225.

The origin of religious belief and the conditions of its development. The history and significance of some of the more highly developed religions, such as Buddhism, Mohammedanism, and Christianity.

14. **Psychology and Philosophy of Religion.** Second term. Credit two hours. Not open to underclassmen. Dr. PAINE. T Th 12. *Goldwin Smith* 225.

Psychological analysis of some of the more important types of contemporary individual and social religious experience; relation of religion to science; the question of the place of religion in a philosophical account of the world.

15. **The Philosophy and History of the Natural Sciences.** First term. Credit three hours. Open to juniors, seniors, and graduates. Assistant Professor SMART. M W F 3. *Goldwin Smith* 225.

A study of the process of scientific reasoning, as illustrated by the historical development of important scientific conceptions in Mathematics, Physics, Chemistry, and Biology, and in relation to philosophy.

17. **Problems in Metaphysics.** First term. Credit two hours. Primarily for graduates. Assistant Professor SMART. T Th 10. *Goldwin Smith* 220.

The subject for the year 1927-28 will be: The philosophy of history and the historical method in Philosophy.

18. **The Problem of Philosophical Method.** Throughout the year. Credit one hour a term. Primarily for graduates. Professor CUNNINGHAM. Tuesday at 2, or hour to be arranged. *Goldwin Smith* 220.

A critical inquiry into the problem of philosophical method as formulated in modern philosophy. The views of classical thinkers will be considered during the first term. The second term will be devoted largely to a study of the views of Bergson, Russell, Bosanquet, and Dewey.

[26. **The Ethics of Modern Utilitarianism.** Throughout the year. Credit three hours a term. Open to qualified seniors and graduates. Professor THILLY. Th 3-5:30. *Goldwin Smith* 220. Not given in 1927-28.]

27. **The Republic of Plato.** Throughout the year. Credit three hours a term. Professor HAMMOND. T 3-5 or hours to be arranged. *Goldwin Smith* 220.

Reading and interpretation of the Greek text.

29. **Modern Idealistic Theory of Ethics.** Throughout the year. Credit three hours a term. Primarily for graduates. Professor THILLY. Th 3-5:30. *Goldwin Smith* 220.

[30. **Empiricism and Rationalism.** First term. Credit three hours. Professor ALBEE. T Th S 11. *Goldwin Smith* 220. Not given in 1927-28.]

Lectures and discussions. The empirical movement as represented by Locke, Berkeley, and Hume, and the rationalistic movement as represented especially by Leibniz. Primarily for graduates.

31. **The Critical Philosophy of Kant.** Second term. Credit three hours. Professor SMART. T Th S 10. *Goldwin Smith* 220.

Lectures and discussions. A study of the *Critique of Pure Reason* and of the *Critique of Judgment*, with frequent references to standard commentaries and to more recent interpretations. Primarily for graduates.

32a. **Empiricism.** First term. Credit three hours. Primarily for graduates. Professor CUNNINGHAM. T Th S 11. *Goldwin Smith* 220.

A study of the epistemological writings of Locke and Hume.

32. **Early Rationalism: Spinoza and Leibniz.** Second term. Credit three hours. Professor CUNNINGHAM. T Th S 11. *Goldwin Smith* 220.

A critical study of early Rationalism, with special reference to the divergent tendencies represented by Spinoza and Leibniz. Primarily for graduates.

[34. **Modern British Idealism.** Second term. Credit two hours. Professor ALBEE. Not given in 1927-28.]

37. **Seminary in Ethics.** Throughout the year. Credit two hours. Open only to graduates. Professor THILLY. Hours to be arranged. *Goldwin Smith* 220.

38. **Seminary in Ancient and Mediaeval Philosophy.** Throughout the year.

Credit two hours a term. Professor HAMMOND. M 3-5, or hours to be arranged. *Goldwin Smith 220.*

39. **Seminary in Metaphysics.** Throughout the year. Two hours a term. For graduate students only. Professor CUNNINGHAM. Monday at 3, or hours to be arranged. *Goldwin Smith 220.*

Topic for the year 1927-28: The Problem of Mind. An intensive historical and critical study of the problem of mind, with especial reference to the present situation.

40. **Seminary in Logic.** Throughout the year. Credit two hours a term. For graduate students only. Assistant Professor SMART. F 3, or hours to be arranged. *Goldwin Smith 220.*

The subject for the year 1927-28 will be Contemporary Logical Theories. Johnson, Dewey, *et al.*

41. **Seminary in Aesthetics.** Throughout the year. Credit two hours a term. Professor HAMMOND. Hours to be arranged. *Goldwin Smith 220.*

Historical study of aesthetic theories. Primarily for graduates, and open to seniors only by permission.

PHYSICAL EDUCATION

The following courses are designed, not only to train teachers and directors of physical education in public schools and colleges, but also to provide a general course of study which may have both a practical and a broad educational appeal. A four-year undergraduate course has been outlined to meet the requirements for the New York State Teacher's Certificate in Physical Education, copies of which may be obtained upon application.

20. **History and Literature of Physical Education.** First term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith 236.*

For juniors and seniors. The distinguishing characteristics of various peoples, as to habits of living and forms of physical activity; the part these have played in their national development.

21. **Modern Developments in Physical Education.** Second term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith 236.*

A continuation of course 20, dealing with the history and various aspects of the physical education movement in Europe and America.

22. **Theory of Physical Education and Methods of Teaching.** Second term. Credit two hours. Professor JORDAN. M W 11. *Goldwin Smith 162.*

For juniors and seniors. The objects and scope of physical education; the principles and technique involved in its teaching, arrangement, classification, and progression of exercises.

23. **Organization and Administration of Play, Athletics, and Gymnastics.** Second term. Credit three hours. Professor YOUNG and instructors. M W F 8. *Goldwin Smith 236.*

For juniors and seniors. The social and educational value of play, with special emphasis upon the management and supervision of athletic sports, recreation centers, scouting activities, etc.

24. **School and Industrial Hygiene.** First term. Credit two hours. Professor YOUNG and Dr. GOULD. T Th 12. *Goldwin Smith 242.*

For juniors and seniors. Sanitary aspects of school and factory environment; methods and scope of health instruction and supervision.

25. **First Aid.** Repeated in second term. Credit one hour. Dr. SHOWACRE and Professor YOUNG. First term, F 8; second term, F 12. *Goldwin Smith 236.*

First aid measures to be used in cases of emergency and their practical application. (If more than thirty students register, other 8 o'clock sections will be added.) May not be counted on ninety hours required in Arts and Sciences.

26. **Physical Inspection.** Second term. Credit two hours. Dr. GOULD and Professor YOUNG. T Th 12. *Goldwin Smith 242.*

For juniors and seniors. The defects and deformities met with in the school room; the nature, causes, signs, and symptoms of the more common diseases.

27. Kinesiology, Physiology, and Prescription of Exercise. First term. Credit three hours. Dr. GOULD and Professor YOUNG. M W F 12. *Goldwin Smith* 236.

For juniors and seniors. The anatomical mechanics of movement; the technique and effects of therapeutic gymnastics, corrective appliances, and massage.

28. Anthropometry. Second term. Credit one hour. Professor YOUNG, F 11. *Goldwin Smith* 248.

Physical measurements and their practical application to problems of growth and development.

PHYSICS

Students who wish to continue the study of Physics after completing one of the introductory courses are advised to consult with some member of the Physics Faculty, who will be glad to advise them regarding the courses best suited to their needs or interests. Those who desire to follow Physics as a profession, either in education or in research or testing laboratories, should also consult with the department concerning the opportunities in the field.

In general, those who intend to specialize in Physics should take Courses 61, 62, and 65, which are prerequisite to more advanced work. For those who do not wish to specialize, but who have a general interest in the subject, elections from Courses 45, 55, 61, 62, 65, 551, 611, 612, and 621 are suggested.

Students expecting to elect Physics for their upperclass group are advised to complete Mathematics 4 or its equivalent before the beginning of the junior year.

Examinations for those who were unavoidably absent from either term examination in courses 3 to 6, and for those who have conditions to make up, will be held on Monday, September 26, 1927, at 10 a. m. in Rockefeller A. Similar examinations in connection with courses 28 to 65 will be held in Rockefeller A at 2 p. m. on the same day. Students expecting to take any of these examinations should notify the department no later than September 15, 1927.

Entrance Physics is not accepted as an equivalent of any of the courses offered by the department.

GENERAL COURSES

***3. Introductory Experimental Physics.** First term. Credit three hours. Lectures, Professor MERRITT. W F 9 or W F 11. *Rockefeller A.* Laboratory, Messrs. BARNES, CARR, FISHER, GOLDSMITH, HIRSH, LARSEN, MARCHANT, MAY, NELSON, and THEN. One two-hour period a week to be arranged. *Rockefeller* 220.

Demonstration lectures and laboratory work covering properties of matter, sound, and light.

Courses 3 and 4 form a continuous first course. Course 4 may be taken before course 3 if this sequence is preferred.

***4. Introductory Experimental Physics.** Second term. Credit three hours. Lectures, Assistant Professor HOWE. W F 9 or W F 11. *Rockefeller A.* Laboratory staff as in course 3. One two-hour period a week to be arranged. *Rockefeller* 220.

Demonstration lectures and laboratory work covering heat, magnetism, and electricity.

***5. Introductory Physics.** Second term. Credit five hours. Assistant Professor COLLINS and ———. Lectures, T Th S 12. *Rockefeller A.* Two recitations to be arranged.

Open only to candidates for B. Chem.

***6. Introductory Physics.** Repeated in second term. Credit six hours. Prerequisite, equivalent of Mathematics 1-3; Entrance Physics desirable. Assistant Professor COLLINS, and Messrs. KINKAID, LARSEN, MAY, RIDDLE, and ZIMMERMAN. Lectures T Th S 12. *Rockefeller A.* Three recitations to be arranged. Required of students in Engineering.

28. General Physics. First term. Credit two hours. Prerequisite, Physics 6 and Mathematics 5a, 5b. Professor BIDWELL and Messrs. STANTON, CHILDS,

PARMLEY, REICH, SEEMANN, and WARBURTON. Day and hour to be arranged. *Rockefeller*.

Theory and problems covering selected topics in mechanics, properties of matter, sound, and heat. Required of candidates for the degree of M.E. or E.E.

29. **General Physics.** Second term. Credit two hours. Prerequisite, Physics 28. Staff as in Course 28. Day and hour to be arranged. *Rockefeller*.

Continuation of Physics 28. Selected topics in light and electricity. Required of candidates for the degree of M.E. or E.E.

31. **Heat and Light.** First term. Credit two hours. Prerequisite, Physics 5 and Mathematics 5a. Professor BIDWELL and Mr. WILBER. M W 10, T Th 8. *Rockefeller*.

Theory and problems. Required of candidates for B. Chem.

32. **Magnetism and Electricity.** Second term. Credit two hours. Prerequisite, Physics 31 or equivalent. Professor BIDWELL and Mr. WILBER. M W 10. T Th 8. *Rockefeller*.

Theory and problems. Required of candidates for B. Chem.

34. **Physical Measurements.** Throughout the year, starting either term. Credit two hours a term. Prerequisite, Physics 6 and Mathematics 5a and 5b. Professor BIDWELL and instructors. Eight sections, to be assigned. *Rockefeller* 250.

Physical measurements in properties of matter, mechanics, heat, light, sound, magnetism and electricity; the adjustment and use of instruments of precision. Required of candidates for B. Chem., M.E., and E.E.

[45. **Brief Survey of Modern Physical Theories.** Second term. Credit three hours. Prerequisite, Physics 14 or 65, and Mathematics 4a and b. Professor RICHTMYER. Lectures, M W F 11. *Rockefeller* C. Not given in 1927-28.]

55. **Introductory Physical Experiments.** Either term. Credit three hours. Prerequisite, Physics 3 and 4, or 6, or the equivalent. Professor GIBBS and Messrs. WHITE and HALL. T Th 8-10:30, T Th 2-4:30, W F 2-4:30. *Rockefeller* 300-B.

Two laboratory periods a week, with reports. Fundamental experiments covering properties of matter, heat, light, sound, magnetism, and electricity. Primarily intended for students in the College of Arts and Sciences who wish a general knowledge of experimental Physics.

61. **General Physics.** First term. Credit three hours. Prerequisite, Physics 4, and Mathematics 1 and 3. Assistant Professor COLLINS. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering heat, magnetism, and electricity.

62. **General Physics.** Second term. Credit three hours. Prerequisite, Physics 3, and Mathematics 1 and 3. Assistant Professor COLLINS. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering properties of matter, sound, and light.

Physics 61 and 62 are designed to meet the needs of students who desire a somewhat detailed survey of the fundamentals of Physics. Physics 61 may be taken either before or after 62.

65. **Physical Measurements.** Either term or throughout the year. Credit two or four hours a term. Prerequisite, Mathematics 4a, 4b; Physics 62 must precede or accompany the first half, and Physics 61 the second half, of Physics 65. Professor BIDWELL and Mr. HANSON. One three-hour laboratory period a week on T or Th 8-1. *Rockefeller* 250.

Quantitative laboratory work in mechanics, heat, light, sound, electricity, and magnetism, with special reference to methods of measurement, sources of error, the adjustment and use of instruments of precision, and graphical methods of interpreting results. Primarily for students in Arts and Sciences.

91. **The Teaching of Physics in Secondary Schools.** Second term. Credit two hours. Prerequisite, courses 55, and 61 or 62. Mr. FISHER. M W 10, or hour to be arranged.

This course fulfils a part of the requirement for the New York State Teacher's Certificate.

105. Advanced Laboratory Practice. First term. Credit three hours. Prerequisite, Physics 55 or 65 (four hours). Assistant Professor MURDOCK and Mr. RUSSELL. Lectures, T 2. *Rockefeller* 301.

One lecture and two laboratory periods a week. Considerable time will be spent on each of a small number of experiments selected to meet the requirements of the individual student. The lectures will include an introductory discussion of the theory of measurements and applications to laboratory problems.

106. Advanced Laboratory Practice. First and second term. Credit one to three hours, depending on the amount of work done. Prerequisite, ordinarily the same as Physics 105. Admission after consultation with the instructor. Assistant Professor MURDOCK; in certain fields of experimentation other members of the department will cooperate in directing the work. *Rockefeller* 301.

[111. Mechanics. First term. Credit three hours. Prerequisite, Physics 62, 65 (two hours), and Mathematics 4. Professor GIBBS. This course is given in alternate years. Not given in 1927-28.]

[112. Properties of Matter. Second term. Credit three hours. Prerequisite, Physics 111. Assistant Professor MURDOCK. This course is given in alternate years. Not given in 1927-28.]

120. Electricity and Magnetism. Throughout the year. Credit three hours a term. Prerequisite, Physics 61, 62, 65 (four hours), and Mathematics 4. Assistant Professor MURDOCK. M W F 8. *Rockefeller*. This course is given in alternate years.

A study of the fundamentals of electricity and magnetism, based upon Starling's "Electricity and Magnetism for Advanced Students."

[130. Light. Second term. Credit three hours. Prerequisite, Physics 62, 65 (two hours), and Mathematics 4 or the equivalent. Assistant Professor MURDOCK. This course is given in alternate years. Not given in 1927-28.]

140. Heat. Second term. Credit three hours. Prerequisite, Physics 61, 62, 65 (two hours), and Mathematics 4. Professor BIDWELL. T Th S 10. This course is given in alternate years.

A general survey of the results of experimentation in heat. An elementary discussion of thermodynamics and of the kinetic theory, and their use in interpreting experimental results.

160. Wave Motion and Sound. First term. Credit three hours. Prerequisite Physics 62, 65 (two hours), and Mathematics 4 or the equivalent. Assistant Professor COLLINS. T Th S 10. This course is given in alternate years.

The general properties of wave motion, considered in connection with the comparative study of elastic waves, waves on the surface of liquids and electromagnetic waves, and a detailed study of sound, based on Barton's "Textbook on Sound."

[170. Introduction to Modern Physical Theories. Throughout the year. Credit three hours a term. Prerequisites, Physics 120 or 130, or the equivalent. Professor RICHTMYER. This course is given in alternate years. Not given in 1927-28.]

211. Mechanics. Throughout the year. Credit three hours a term. Prerequisite, Physics 111. Primarily for graduates. Assistant Professor KENNARD.

This course is given in alternate years. The mechanics of systems of particles and of rigid bodies; generalized coordinates and Hamilton's principle; elementary theory of hydrodynamics and of elasticity.

[220. Electricity and Magnetism. Throughout the year. Credit three hours a term. Prerequisite, Physics 120 or the equivalent. Primarily for graduates. Assistant Professor KENNARD. This course is given in alternate years. Not given in 1927-28.]

230. Physical Optics. First term or throughout the year. Credit three hours. Prerequisite, Physics 130 or the equivalent. Primarily for graduates. Assistant Professor Howe.

This course is given in alternate years. The wave theory of interference,

diffraction, and polarization; the electromagnetic theory of dispersion and absorption; magneto-optics.

[240. **Applications of Thermodynamics in Physics.** First term. Credit two hours. Prerequisite, Physics 140 or the equivalent. Professor MERRITT. Not given in 1927-28.]

300. **Physics Seminary.** Throughout the year. Credit one hour a term. For seniors and graduates. Professor MERRITT. M 3:15. *Rockefeller C.*

SPECIAL TOPIC COURSES

[401. **Theory of Measurements.** Second term. Credit two hours. Prerequisite, Physics 105. Assistant Professor MURDOCK. Not given in 1927-28.]

415. **Special Topics in Physics.**

For graduates. Reading in any branch of physics, experimental or theoretical, under the guidance of some member of the staff, supplemented by reports and regular conferences. In theory, possible topics among many are,—elasticity, fluid motion, theory of sound, the electromagnetic field, or a narrower field including its recent developments may be chosen.

425. **Aerodynamics and the Mechanics of Flight.** Second term. Credit one hour. Prerequisite, Physics 14. Professor BEDELL. M F 10. *Rockefeller 155.*

473. **Quantum Theory.** First term. Credit three hours. Professor KENNARD. Primarily for graduates. The origin of the theory and applications to heat, atomic structure, spectra, emission, and absorption.

480. **Quantum Mechanics.** Second term. Credit three hours. Assistant Professor KENNARD. Primarily for graduates with major in theoretical physics. The necessary special mathematics will be included.

505. **High Temperature Measurements.** Second term. Credit three hours. Prerequisite, Physics 34 or 65. Professor BIDWELL.

525. **Thermodynamics.** Throughout the year. Credit three hours. Prerequisite, Mathematics 41. Mathematics 42 is recommended. Professor TREVOR. Day and hour to be arranged.

571. **Spectroscopy and Luminescence.** Throughout the year. Credit two hours a term. Prerequisite, Physics 130 or its equivalent. Professor GIBBS. M W 9 or as arranged. *Rockefeller.*

A somewhat detailed study of the more important experimental and theoretical aspects of these fields. Lectures and assigned readings. Given in alternate years.

573. **Spectroscopy and Luminescence.** First term. Credit variable. Prerequisite, Physics 105 and 130, or the equivalent. Professor GIBBS and Mr. GARTLEIN. Day and hour to be arranged. *Rockefeller.*

Laboratory work for a limited number of students.

[581. **Atomic Structure.** Second term. Credit three hours. For graduate students only. Professor GIBBS. Given in alternate years. Not given in 1927-28.]

The development of modern atomic theory and its application in the explanation of spectral series, resonance, and ionizing potentials, and fine structure; the structure of the nucleus as revealed by radioactive and isotopic phenomena and the effects of high speed bombardment.

591. **X-Rays and the Structure of Matter.** First term. Credit three hours. For graduate students only. Professor ——— M W F 11. *Rockefeller.*

The production and measurement of X-rays; laws of emission, scattering and absorption; the relation of these laws to atomic structure, crystal structure, quantum theory and similar problems. Given in alternate years.

[605. **Conductivity and Magnetism.** First term. Credit two hours. Professor KENNARD. Not given in 1927-28.]

611. **Electric Waves and Oscillations.** First term. Credit one hour. Prerequisite, Introductory Physics. Professor MERRITT. M 12. *Rockefeller B.* Experimental lectures. Given in alternate years.

612. **Special Topics in Recent Experimental Physics.** Second term. Prerequisite, Introductory Physics. Professors MERRITT and GIBBS, and Assistant Professor MURDOCK. M 12. *Rockefeller B.*

The subject matter of this course will change from year to year. May be taken as a continuation of course 611.

613. Electric Waves and Oscillations. Second term. Laboratory. Credit one to four hours. Prerequisite, Physics 65 and 611, or the equivalent. Professor MERRITT and Mr. ZIMMERMAN. Day and hour to be arranged.

[621. Electrical Conduction in Gases. Prerequisite, Introductory Physics. Professor MERRITT. Experimental lectures. Given in alternate years. Not given in 1927-28.]

633. Alternating Currents. First term. Credit two hours. Prerequisite, Physics 34 or 65. Professor BEDELL. M W 11. *Rockefeller* 155.

A study of the underlying principles of alternating currents; the development of graphical methods of analysis as a basis for testing and for the solution of practical problems.

634. Electrical Laboratory. Either term, or throughout the year. Credit variable. Prerequisite, Physics 34 or 65. Professor BEDELL and Mr. REICH. Daily 9-1. *Rockefeller*.

Direct and alternating current measurement, and the investigation of special problems. The character of the work will be varied to meet individual needs.

636. Advanced Alternating Currents. Second term. Credit two hours. Prerequisite, Physics 633. Professor BEDELL. T Th 11. *Rockefeller* 155.

Discussion of the theory and measurement of alternating currents. A seminary for graduates.

637. Theses in Applied Electricity. Second term or throughout the year. Credit two to eight hours a term. Prerequisite, Physics 34 or 65. Professor BEDELL. Day and hour to be arranged. *Rockefeller*.

PSYCHOLOGY

The student may choose as his first course any one of the equivalent courses Psychology 1, 1a, or 1b. Psychology 1 is open only to sophomores in the College of Arts and Sciences; 1a and 1b are open to sophomores, juniors, and seniors in all colleges.

Students who wish to take courses 1, 1a, 1b, or 2 should go, on one of the registration days, to Morrill Hall, middle entrance, third floor, for assignment to seats and sections.

***1. Elementary Psychology.** First term. Credit three hours. Professor TITCHENER, Assistant Professor HOISINGTON, Dr. BIXBY, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. Lectures, T Th 11. *Goldwin Smith C.* Classroom work, S 10 or 11.

Not open to juniors or seniors. For sophomores in the College of Arts and Sciences.

***1a. Elementary Psychology.** First term. Credit three hours. Assistant Professor DALLENBACH, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. Lectures, M W 12. *Goldwin Smith C.* Classroom work, F 10, 11, or 12.

Open to sophomores, juniors, and seniors in all colleges.

***1b. Elementary Psychology.** Second term. Credit three hours. Assistant Professor HOISINGTON, Dr. BIXBY, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. Lectures, M W 12. *Goldwin Smith C.* Classroom work, F 10, 11, or 12.

Open to sophomores, juniors, and seniors in all colleges.

2. General Psychology: Problems and Points of View. Second term. Credit three hours. Prerequisite, Psychology 1, 1a, or 1b. Professor WELD, Assistant Professor HOISINGTON, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. Lectures, T Th 11. *Goldwin Smith C.* Classroom work, S 10, or 11.

3. Experimental Psychology: Qualitative. Repeated in second term. Credit three hours. Prerequisite, Psychology 1, 1a, or 1b. Professor WELD, Assistant Professors DALLENBACH and HOISINGTON, Dr. BIXBY, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. M W F 2-4. *Morrill, Psychological Laboratory.*

4. Experimental Psychology: Quantitative. Repeated in second term. Credit three hours. Prerequisite, Psychology 3. Professor WELD, Assistant Professors DALLENBACH and HOISINGTON, Dr. BIXBY, Dr. FELDMAN, Mr. KREEZER, and Mr. GRIFFIN. M W F 2-4. *Morrill, Psychological Laboratory.*

5. Systematic Psychology: Sensation and Image. First term. Credit three

hours. Prerequisite, Psychology 3, or, by special permission, Psychology 2. Professor WELD and Dr. BIXBY. M W F 9. *Morrill 42.*

[5a. **Systematic Psychology: Perception and Idea.** First term. Credit three hours. Not given in 1927-28.]

6. **Systematic Psychology: Feeling and Emotion; Attention.** Second term. Credit three hours. Prerequisite, Psychology 3, or, by special permission, Psychology 2. Assistant Professors DALLENBACH and HOISINGTON, and Dr. FELDMAN. M W F 9. *Morrill 42.*

[6a. **Systematic Psychology: Memory and Imagination; Thought; Action and Volition.** Second term. Credit three hours. Not given in 1927-28.]

7. **Reading of German Psychology.** First term. Credit one hour. Prerequisite, a course in Systematic Psychology. Professor WELD. Day and hour to be arranged. *Morrill 46.*

8. **Reading of French Psychology.** Second term. Credit one hour. Prerequisite, a course in Systematic Psychology. Professor WELD. Day and hour to be arranged. *Morrill 46.*

9. **Psychological Problems.** Throughout the year. Credit one to five hours. Prerequisite, Psychology 4. Professor WELD, Assistant Professors DALLENBACH and HOISINGTON. Time to be arranged. *Morrill, Psychological Laboratory.*

PUBLIC SPEAKING

1. **Public Speaking.** Throughout the year. Credit three hours a term. Not open to freshmen. Assistant Professors MUCHMORE and WICHELS, and Messrs. THOMAS, WOHL, WAGNER, HARSHBARGER, HOWELL, and DUNHAM. First term: M W F 9, 10, 11, 12; T Th S 9, 10, 11. Second term: M W F 9, 10, 11, 12; T Th S 9, 10. Rooms to be announced.

Planned to give the fundamentals of speech preparation and to develop simple and direct speaking. Required readings on selected topics; conferences and drill.

The '86 Memorial Prize for declamation is awarded in connection with the second term of this course. See the University pamphlet, Prize Competitions.

Students must apply at *Goldwin Smith 26* on registration days of each term for assignment to sections.

1a. **Public Speaking.** Second term. Credit three hours a term. Not open to freshmen. Assistant Professor MUCHMORE and Messrs. WOHL, WAGNER, HARSHBARGER, and HOWELL. M W F 9, 11, 12; T Th S 8, 9, 10. Rooms to be announced.

This course repeats the work of the first term of course 1.

Students must apply at *Goldwin Smith 21* on registration days for assignment to sections.

8. **Voice Training.** Repeated in second term. Credit two hours. Open by consent of the instructor. Mr. THOMAS. M W F 10. *Goldwin Smith 26.*

An elementary course for developing flexibility and strength of voice, purity of tone, and accuracy of enunciation and articulation.

10. **Oral Reading.** Repeated in second term. Credit three hours. Not open to freshmen. First term: Assistant Professor MUCHMORE. M W F 9. *Goldwin Smith 26.* Mr. THOMAS. T Th S 11. *Goldwin Smith 26.* Second term: Mr. THOMAS. M W F 9. *Goldwin Smith 26.* Mr. WOHL. T Th S 11. *Goldwin Smith 26.* Mr. ———. T Th S 11. *Goldwin Smith 21.*

Training in expressive reading based on the interpretative study of prose and poetry. Students must apply at *Goldwin Smith 27* on registration days of each term for assignment to sections.

12. **Argument and Debate.** First term. Credit three hours. Prerequisite, Public Speaking 1a or one term of Public Speaking 1. Mr. WAGNER. M W F 11. *Goldwin Smith 21.* Assistant Professor WICHELS. T Th S 9. *Goldwin Smith 21.* T Th S 10. *Goldwin Smith 21.*

Training in the logical elements of public discussion, investigation, analysis of evidence, briefing, detection of fallacies; and in the delivery of argument.

Students must apply at *Goldwin Smith 25* on registration days for assignment to sections.

12a. **Advanced Argument.** Second term. Credit two hours. Prerequisite,

Public Speaking 12, and the consent of the instructor. Assistant Professor WICHELS. Hours to be arranged.

13. **Argumentative Method.** Second term. Credit three hours. Open by consent of the instructor to upperclassmen. Assistant Professor WICHELS. M W F 11. *Goldwin Smith* 28.

Public opinion and its formation studied with reference to modern views and applications of rhetorical theory.

14. **American Debate.** Second term. Credit three hours. Not given in 1927-28.]

15. **Persuasion and the Forms of Address.** Throughout the year. Credit three hours a term. Prerequisite, Public Speaking 1 and consent of instructor. Assistant Professor MUCHMORE. M W F 12. *Goldwin Smith* 26.

Advanced public speaking; problems of interest; persuasion and rhetorical technique; critical reading of typical masterpieces; composition and delivery of various types of public address.

16. **Classical Rhetoric.** First term. Credit three hours. Assistant Professor WICHELS. Not given in 1927-28.]

17. **British Orators.** Second term. Credit three hours. Assistant Professor MUCHMORE. Not given in 1927-28.]

18. **History of Rhetoric and Oratory.** First term. Credit three hours. Open by consent of the instructor to graduates and upperclassmen. Assistant Professor WICHELS. T Th S 12. *Goldwin Smith* 21.

A survey. Lectures, readings, and reports.

20. **Problems and Methods.** Second term. Credit two hours. For graduates; open to seniors by permission. Professor DRUMMOND. Hours to be arranged.

25. **Phonetics and Speech Training.** Second term. Credit three hours. Prerequisites, one term of Public Speaking 1 (or 1a), 8, and the consent of the instructor. Assistant Professor MUCHMORE. Hours to be arranged.

A study of English phonetics, voice training, diction, principles of oral expression, and methods of improving normal and defective speech.

This course is recommended by the department to those intending to teach oral English, public speaking, and dramatics.

30. **Dramatic Interpretation.** First term. Credit three hours. Open by consent of the instructor to upperclassmen. Professor DRUMMOND. M W F 2. *Goldwin Smith* 26.

Dramatic interpretation, and the principles of stage direction and production.

31. **Dramatic Production.** Second term. Credit three hours. Prerequisite, Public Speaking 30, and the consent of the instructor. Dr. STANTON. T Th 2; laboratory, T 3-6 or W 2-5. *Morse*.

Theory and practice of dramatic production.

40. **Seminary in Dramatic Production.** Throughout the year. Credit two hours a term. Primarily for graduates. Professor DRUMMOND. M 4-6. *Goldwin Smith* 21.

42. **Seminary in Speech Training.** Throughout the year. Credit two hours a term. Primarily for graduates. Assistant Professor MUCHMORE. Not given in 1927-28.]

44. **Seminary in Rhetoric and Eloquence.** Throughout the year. Credit two hours a term. Primarily for graduates. Assistant Professor WICHELS. T 3. *Goldwin Smith* 25.

Classical and Mediaeval Rhetoric. Assistant Professor CAPLAN. See Greek 33, and Latin 33.

Informal Study and Theses. Qualified seniors may, with the approval of the department, register for informal study or theses in rhetoric, public address, speech training, or dramatic production.

Additional opportunities for training under the supervision of the department are provided by the University Prize Speaking Contests (the Woodford, the '86 Memorial, the '94 Memorial) in charge of Assistant Professor MUCHMORE, by the intercollegiate debate teams under the supervision of Assistant Professor WICHELS, and by the Cornell Dramatic Club under the direction of Professor DRUMMOND.

ROMANCE LANGUAGES

FRENCH

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours. M W F 12, T Th S 8.

The course is continuous throughout the year and no credit is allowed for the first term alone. Students with first year entrance French should enter the course the second term.

*3. **Intermediate Course.** Repeated in second term. Credit six hours; upperclassmen, four hours. Prerequisite, French 1, or second year entrance French. First term: daily 8, 9, 11. Second term: daily 8.

*4a. **Rapid Reading of French.** Repeated in second term. Credit three hours. Prerequisite, French 3, 3a, or third year entrance French. First term: M W F 9, M W F 12, T Th S 11. Second term: M W F 10, M W F 11, T Th S 9.

Translation and outside reading.

Designed primarily for students intending to continue the study of French. May not be taken except in conjunction with 5a.

*4b. **Advanced Rapid Reading of French.** Repeated in second term. Credit three hours. Prerequisite, French 4a. First term: T Th S 11. Second term: M W F 8, M W F 9, M W F 10, T Th S 11, T Th S 12.

Translation and outside reading.

*5a. **Elementary Composition.** Repeated in second term. Credit three hours. Prerequisite, French 3, 3a, or third year entrance French. First term, M W F 11, T Th S 9, T Th S 12. Second term: M W F 9, T Th S 10, T Th S 11.

*5b. **Elementary Composition.** Second term. Credit three hours. Prerequisite, French 5a or 6. M W F 11, T Th S 9, T Th S 10. *Goldwin Smith 283.*

*6. **Freshman French: Translation and Composition.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 3 or third year entrance French. Designed primarily for the satisfaction of underclass requirements in foreign languages. M W F 8, 9, 10, 12; T Th 10, 11.

7. **Intermediate Composition.** Throughout the year. Credit three hours a term. Prerequisite, French 5b. Professor PUMPELLY. M W F 10, M W F 12. *Goldwin Smith 277.*

Composition, conversation, and discussion of selected topics in French grammar. Course 7 is conducted in French.

9. **Advanced Composition.** Throughout the year. Credit three hours a term. Prerequisite, French 7. Professor GUERLAC. M W F 10. *Goldwin Smith 283.*

Rapid translation from English; themes and talks by students on literary and historical topics. The course is conducted in French.

16. **History of French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 4b, or French 6. Professor MASON. M W F 11. Lectures on French Literature since the Middle Ages.

17. **Literature of the Seventeenth Century.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor GUERLAC.

[18. **Voltaire and His Time.** Throughout the year. Credit three hours. Prerequisite, French 16. Professor GUERLAC. M W F 11. *Goldwin Smith 281.* Lectures, outside reading, and reports. Not given in 1927-28.]

19. **The Romantic Movement in French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.*

[20. **Modern French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. Not given in 1927-28.]

[21. **Contemporary French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. Not given in 1927-28.]

[22. **French Phonetics.** Second term. Credit two hours. Professor MASON. M W 8. *Goldwin Smith 281.* Not given in 1927-28.]

23. **French Philology.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 5a and entrance Latin. Professor PUMPELLY. T 10, Th 2:30-4:30. *Goldwin Smith 277.*

Lectures on the historical development of the French language, with a detailed phonological and morphological study of the *Chanson de Roland*.

30. **The Teaching of French.** Second term. Credit two hours. Professor MASON. Given in alternate years.

31. **Prose of the Sixteenth Century.** Second term. Credit one hour. Prerequisite, French 16. Professor MASON. Given in alternate years.

32. **Poetry of the Sixteenth Century.** Second term. Credit one hour. Prerequisite, French 16. Professor MASON. F 8. *Goldwin Smith* 281.

Open to juniors, seniors, and graduates. Not given in 1927-28.]

35. **French Critics, Orators, Historians, and Moralists of Modern and Contemporary France in the Nineteenth Century.** First term. Credit two hours. Professor GUERLAC. T Th 11. *Goldwin Smith* 283.

Lectures in French with outside readings and reports.

36. **Lectures in French.** Second term. Credit two hours. Professor GUERLAC T Th 11. *Goldwin Smith*.

La France d'aujourd'hui; le pays, la nation, les institutions, la vie intellectuelle, sociale, et politique. Not given in 1927-28.]

41. **Old French Texts.** First term. Credit two hours. Primarily for graduates. Hours to be arranged. Professor HAMILTON.

43. **Old Provençal Philology and Literature.** Second term. Credit two hours. Hours to be arranged. Professor HAMILTON.

47. **Modern French Seminary.** Throughout the year. Credit two hours a term. Professor MASON. T 2:30. *Library, French Seminary.*

Primarily for graduates.

ITALIAN

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of course. Professor PUMPELLY. M W F 9. *Goldwin Smith* 283.

The course is continuous throughout the year and no credit will be allowed for the first term alone.

4. **Nineteenth Century Literature.** Throughout the year. Credit three hours a term. Prerequisite, Italian 1, or its equivalent. Professor HAMILTON. T Th S 9. *Goldwin Smith* 281.

Novels and criticism of the nineteenth century.

14. **Italian Poetry.** Throughout the year. Credit three hours a term. Prerequisite, Italian 4, or the equivalent. Professor HAMILTON. T Th 11. *Goldwin Smith* 281.

Dante, *Divina Commedia*; Leopardi, *Rime*; Carducci, *Poesie*, will be read in class. Readings and reports for extra-class work.

15. **The Literature of the Italian Renaissance.** Second term. Credit three hours. Prerequisite, Italian 14. Professor HAMILTON. Hours and room to be arranged.

Petrarch, *Rime*; Machiavelli, *Principe*; Ariosto, *Orlando Furioso*. Outside readings and reports.

SPANISH

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours. M W F 12, T Th S 8.

The course is continuous throughout the year and no credit is allowed for the first term alone. Students entering with one unit in Spanish should take the second term of course 1.

*3. **Intermediate Course.** Repeated in second term. Credit six hours; upperclassmen, four hours. Prerequisite, Spanish 1, or second year entrance Spanish. First term: daily 8, 9. Second term: daily 9.

*4a. **Advanced Translation.** Repeated in second term. Credit three hours a term. Prerequisite, Spanish 3, or third year entrance Spanish. First term: M W F 8; T Th S 12. Second term: T Th S 9; T Th S 10.

Translation, outside reading of modern novels and plays. Course 4a may not be taken except in conjunction with 5a. Primarily for students desiring to continue the study of Spanish.

*4b. **Advanced Translation.** Repeated in second term. Credit three hours. Prerequisite, Spanish 4a. First term: T Th S 10; Second term: M W F 8.

Translation, outside reading, and discussion of representative works of Spanish literature.

*5a. **Elementary Composition.** Repeated in second term. Credit three hours a term. Prerequisite, Spanish 3 or third year entrance Spanish. First term: T Th S 9; T Th S 10. Second term: M W F 9; M W F 10.

*5b. **Elementary Composition.** Second term. Credit three hours a term. Prerequisite, Spanish 5a. T Th S 10. *Goldwin Smith* 290.

*6. **Freshman Spanish.** Translation and Composition. Throughout the year. Credit six hours on completion of the course. Prerequisite, Spanish 3 or third year entrance Spanish. Designed primarily for the satisfaction of the underclass requirement in foreign language. M W F 11, M W F 12.

7a. **Intermediate Composition.** First term. Credit three hours a term. Prerequisite, Spanish 5b. T Th S 12. *Goldwin Smith* 277.

7b. **Intermediate Composition.** Second term. Credit three hours a term. Prerequisite, Spanish 7a. T Th S 12. *Goldwin Smith* 281.

Courses 7a and 7b are conducted in Spanish. Special emphasis is placed on the attainment of accuracy and fluency in both written and oral expression.

9. **Contemporary Spanish Life.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 7b. M W F 11. *Goldwin Smith* 277.

Course 9 is conducted entirely in Spanish.

10. **History of Spanish Literature.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 6 or 4a. Professor DALE. M W F 12. *Goldwin Smith* 283.

15. **Drama of the Golden Age.** First term. Credit three hours. Prerequisite, Spanish 6 or 4a. Professor DALE. T Th S 11. *Goldwin Smith* 277.

17. **Cervantes.** Second term. Credit three hours. Prerequisite, Spanish 6 or 4a. Professor DALE. T Th S 11. *Goldwin Smith* 277.

19. **Prose of the Nineteenth Century.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 6 or 4a. Professor DALE. T Th S 10. *Goldwin Smith* 281.

[20. **Spanish Poetry.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 4a. Professor DALE. Not given in 1927-28.]

[41. **Old Spanish.** Throughout the year. Credit two hours a term. Professor DALE. Not given in 1927-28.]

Primarily for graduates.

[42. **Lope de Vega Seminary.** Throughout the year. Credit two hours a term. Professor DALE. Primarily for graduates. Not given in 1927-28.]

43. **The Picaresque Novel.** Throughout the year. Credit two hours a term. Professor DALE. M 2:30. *Library, Spanish Seminary.* Primarily for graduates.

SCANDINAVIAN LANGUAGES AND LITERATURES

1. **Old Icelandic.** Throughout the year. Credit three hours. Professor HERMANSSON. T Th S, 11. *Library, Greek and Latin Seminary.*

Grammar; reading of sagas, eddic and skaldic poems. For advanced students and graduates.

2. **Danish (and Dano-Norwegian).** Throughout the year. Credit three hours a term. Professor HERMANSSON. M W F 11. *Library, Greek and Latin Seminary.*

Grammar; reading of works by modern Danish and Norwegian authors.

[3. **Swedish.** Throughout the year. Credit three hours. Professor HERMANSSON. Not given in 1927-28.]

[4. **Norse Mythology.** First term. Credit two hours. Professor HERMANSSON. Not given in 1927-28.]

5. **Old Norse-Icelandic Literature.** First term. Credit two hours. Professor HERMANSSON. W F 12. *Goldwin Smith.*

Lectures on the early literature of Norway and Iceland (the Eddas, the skalds, and the sagas).

6. **Modern Scandinavian Literatures.** Second term. Credit two hours. Professor HERMANSSON. W F 12. *Goldwin Smith*.

Lectures on selected periods of Scandinavian literatures.

[7. **Early Scandinavian Civilization and History.** Second term. Credit two hours. Professor HERMANSSON. Not given in 1927-28.]

SEMITIC LANGUAGES AND LITERATURES AND ORIENTAL HISTORY

1a. **Hebrew.** Throughout the year. Credit three hours. Professor SCHMIDT. M T Th 2. *Goldwin Smith* 127.

Open only to juniors, seniors, and graduates.

1b. **Advanced Hebrew.** Throughout the year. Credit two hours. Prerequisite, Semitics 1a. Professor SCHMIDT. T Th 8. *Goldwin Smith* 127.

Proverbs, Canticles, and Esther.

2a. **Arabic.** Throughout the year. Credit two hours. Professor SCHMIDT. T Th 9. *Goldwin Smith* 127.

Open to juniors, seniors, and graduates.

2b. **Advanced Arabic.** Throughout the year. Credit two hours. Prerequisite, Semitics 2a. Professor SCHMIDT. W F 2. *Goldwin Smith* 127.

Selected suras in the Koran and Prolegomena of Ibn Khaldun.

3. **Ethiopic.** Throughout the year. Credit two hours. Prerequisite, Semitics 1a and 2a. Professor SCHMIDT. T Th 3. *Goldwin Smith* 127.

4a. **Assyrian.** Throughout the year. Credit two hours. Prerequisites, Semitics 1a and 2a. Professor SCHMIDT. T Th 4. *Goldwin Smith* 127.

4b. **Aramaic.** Throughout the year. Credit two hours. Prerequisite, Semitics 1a. Professor SCHMIDT. T Th 3. *Goldwin Smith* 127.

5a. **Egyptian.** Throughout the year. Credit two hours. Prerequisite, Semitics 1a and 2a. Professor SCHMIDT. W 4-6. *Goldwin Smith* 127.

Hieroglyphic texts. Primarily for graduates.

5b. **Coptic.** Throughout the year. Credit two hours. Prerequisite, Semitics 5a. Professor SCHMIDT. F 4-6. *Goldwin Smith* 127.

Selections from the gospels.

6. **Biblical Literature.** Throughout the year. Credit two hours. Professor SCHMIDT. M W 3. *Goldwin Smith* 120.

General introduction to the Bible. Open to juniors, seniors, and graduates.

No knowledge is required of Semitic languages or of Greek.

7. **Semitic Seminary.** Throughout the year. Credit two hours. Prerequisite, Semitics 1a and 4b. Professor SCHMIDT. M 4-6. *Goldwin Smith* 120.

Carthaginian and Arabic inscriptions. Primarily for graduates.

8. **Comparative Semitic Philology.** Throughout the year. Credit two hours. Professor SCHMIDT. F 3-5. *Goldwin Smith* 127.

For graduates only.

18. **Oriental History.** Throughout the year. Credit two hours a term. Professor SCHMIDT. A general survey of the history of Asia. Open only to juniors, seniors, and graduates. T Th 10. *Goldwin Smith* 242.

[19. **Oriental History.** Throughout the year. Credit two hours a term. Professor SCHMIDT. A general survey of the history of Africa. Open only to juniors, seniors, and graduates. T Th 10. *Goldwin Smith* 256. Not given in 1927-28.]

UNIVERSITY REQUIREMENTS FOR THE DEGREES A.B. AND B. CHEM.

HYGIENE AND PREVENTIVE MEDICINE

All undergraduate students are required to present themselves to the Medical Advisers and receive a thorough confidential physical examination once a year. Appointments for this examination must be made during the regular registration days of the first term by all entering students and sophomores. Appointments for this examination must be made during the regular registration days of the second term by all juniors and seniors.

All students in the first two years of undergraduate courses are required to attend lectures on Hygiene and Preventive Medicine given once a week throughout the college year. The first year (Hygiene 1 and 2) is devoted to Personal Hygiene, Mental Hygiene, and First Aid. The second year (Hygiene 3 and 4) is devoted to Sanitation, Disease Prevention, and Group Hygiene.

MEN

First Term Schedule:

Hygiene 1—W 11, Th 9, 12, F 9, S 8, 10, 12.

Hygiene 3—M 9, 11, T 9, 11, 12, W 9.

Second Term Schedule:

Hygiene 2—W 11, Th 9, 12, F 9, S 8, 10, 12.

Hygiene 4—M 9, 11, T 9, 11, 12, W 9.

WOMEN

First Term Schedule:

Hygiene 1—Th 10, 11, F 11.

Hygiene 3—M 8, T 10, S 11.

Second Term Schedule:

Hygiene 2—Th 10, 11, F 11.

Hygiene 4—M 8, T 10, S 11.

MILITARY SCIENCE AND TACTICS

1. Practical and Theoretical Training. Throughout the year. Every able-bodied male student (except aliens), a candidate for a baccalaureate degree, who is required to take five, six, seven, eight, or more terms in residence (or the equivalent in scholastic hours), must take in addition to the scholastic requirements for the degree, one, two, three, or four terms respectively in the Department of Military Science and Tactics. Three hours a week, either M T W or Th 2:15–5:15 p. m. *New York State Drill Hall.*

The requirements in Military Science and Tactics must be completed in the first terms of residence; otherwise the student will not be permitted to register again in the University without the consent of the University Faculty.

The course of training is that prescribed by the War Department as basic for Infantry and Field Artillery units (as elected) of Reserve Officers' Training Corps. The Infantry includes instruction in physical training, disciplinary drills, ceremonies, military courtesy, auxiliary weapons (machine guns, automatic rifles, 37 m/m guns, and trench mortars), indoor and outdoor rifle practice, pistol practice, topography and mapping, tent pitching and camp sanitation, signalling, field engineering, field maneuvers, interior guard duty, fundamental principles in minor tactics and leaderships. The Field Artillery includes instruction in organization of the battery, customs of the service, military courtesy and discipline, individual equipment, pistol practice, hippology, gunnery, signalling, physical training, equitation and horsemanship, topography and reconnaissance, and motors.

2. Elective Military Training. Throughout the year. Credit two hours a term. Hours by assignment. *New York State Drill Hall.*

This is the advanced course prescribed by the War Department for units of the Reserve Officers' Training Corps, and includes three hours each week in the performance of the duty of officer or non-commissioned officer with organizations undergoing the training given under course 1, and two hours each week of theoretical instruction in preparation for such duties. Prerequisite, course 1.

Course 2 may be elected only by permission of the Dean of the College of Arts and Sciences, and the Professor of Military Science and Tactics, but credit for this course may not be counted toward the ninety hours required in this college (see page 12). To enjoy the benefits offered by the Federal Government the student must agree to continue the course for four terms, and to attend one summer camp having a duration of about six weeks.

PHYSICAL TRAINING FOR MEN

1. **For Freshmen Excused from Drill.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

2. **For Sophomores Excused from Drill.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

3. **For Juniors and Seniors.** Building up and corrective exercises as prescribed by the Medical Examiners as a result of the physical examination required of all students in the University. Mr. BURKHOLDER.

4. **Boxing, Wrestling, and Fencing.** Instruction at hours to be arranged. Mr. FALLON, Mr. O'CONNELL, and Mr. DARRIEULAT.

5. **Swimming.** Instruction, 4-6 p. m. daily except Saturday. Mr. CRAIGIE.

PHYSICAL TRAINING FOR WOMEN

6. **For Freshmen.** Throughout the year. Three periods a week. Miss BATEMAN, Miss CANFIELD, Miss READ, Miss RYAN, and Miss WATERMAN.

7. **For Sophomores.** Throughout the year. Three periods a week. Miss BATEMAN, Miss CANFIELD, Miss READ, Miss RYAN, and Miss WATERMAN.

The work of the two years consists of outdoor games and exercises from the beginning of the year to Thanksgiving, and from Easter vacation to the end of the year. From Thanksgiving to Easter, the work is in large part indoors, and consists of floor exercises, folk, aesthetic, and interpretative dancing, and indoor games, in all of which certain prescribed tests must be met at the end of each period. For further information as to the required work in physical training, see the handbook issued by the Department.

8. **For Juniors and Seniors.** Building up and corrective exercises as prescribed by the Medical Examiners as a result of the physical examination required of all students in the University. Miss BATEMAN and Miss CANFIELD.

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